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THE CULTURE
OF THE
CHRYSANTHEMUM.

By W. WELLS.

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REVISED EDITION, 1910.

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Wm. **WELLS' BOOK**

ON THE

CULTURE OF THE

CHRYSANTHEMUM

FOR

Exhibition, Decoration,

Cut Flower, and Market.

WITH NUMEROUS

WOODCUTS and PHOTOGRAPHS

OF THE

DIFFERENT BREAKS, INSECT PESTS, etc.

FOURTH EDITION, REVISED AND ENLARGED.

1910.

FIFTIETH THOUSAND.

WRITTEN AND PUBLISHED BY

W. WELLS, CHRYSANTHEMUM NURSERIES,

MERSTHAM, SURREY.

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W. WELLS.

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INTRODUCTION.

The highly flattering reception accorded the last edition of my book, both by the Press and the great body of chrysanthemum growers, has induced me to revise the work and bring it up-to-date. Several chapters have been re-written, and new chapters have been added; and I hope that the lists of the best varieties, which have been carefully compiled, will be found instructive and valuable. The subject of cultural treatment does not, however, allow of much alteration; there is very little that can be added to what I have set forth in former editions, but where it has been possible to amplify the hints previously given I have done so.

The popularity of chrysanthemums continues to increase in all parts of the world. There seems to be no limit to the number of varieties or to the diversity of colours. New specimens are being constantly introduced. And nothing can surpass in public favour the loveliness and gracefulness of the early flowering kinds. In a preface to the last edition I said:

"Of late, newer chrysanthemums easy to cultivate have received considerable attention, and great strides have been made—more particularly with the early flowering varieties. This class of chrysanthemum has much to recommend it. It may be raised by persons of the most limited means; it makes a fine autumn display for beds and borders; or it may be grown in thousands for cut flowers for market. The initial cost is not more than that of the usual bedding-out plants, and therefore early flowering chrysanthemums are within the reach of thousands who cannot cultivate the large indoor varieties."

The foregoing observations are equally true of "earlies" to-day. But considerable advance has been made within the past few years, particularly as regards the introduc-

tion and distribution of early flowering singles. In Chapter VI. will be found a description of the way I succeeded in obtaining these beautiful specimens from seed, and since then they have become extremely popular for decorative purposes.

The " Culture of the Chrysanthemum " is written chiefly as a handbook for amateurs. These are an ever-increasing army. The number of allotment gardens in all parts of the country is tiuly astounding, and I am sometimes filled with admiration by seeing the fine crops that the hard-working, thrifty cultivators of these plots are able to raise. There is a tendency for many allotment holders to develop into market gardeners, and this is very noticeable in the neighbourhood of fairly large towns. One of the best schools in which to learn land cultivation is the allotment ground, where the knowledge and experience that are absolutely essential to success may be gained. The way these sturdy horticulturists have taken to the cultivation of early flowering chrysanthemums for pleasure or profit—or for both—illustrates their readiness to try anything in the nature of a novelty, and it also proves that these varieties may be grown in perfection with the utmost ease in any soil that is capable of raising vegetables. I may say, in passing, that among the hundreds of friendly and encouraging letters which I receive in the course of the year, I value none more highly than those which reach me from my friends, the amateur gardeners, in all parts of the kingdom.

In the chapter dealing with chrysanthemum growing in the United States I have briefly described the methods followed there. The climate is so different from that which we have in Great Britain that the conditions under which gardeners are obliged to work bear small relation to what we are accustomed to at home. For this reason I have contented myself with merely outlining in general terms the way in which chrysanthemums are cultivated by the leading growers. Americans devote their energies to producing the largest possible blooms, and in this direction, aided by the climate, they are eminently success-

ful. Although, perhaps, it is a personal question, I may be permitted to state as a matter of fact that the Wells-Pockett varieties are those which are grown for exhibition more extensively by our American cousins than any other sorts. The soil and climate of America suit them. For this reason I am pleased to say that during a visit I paid to America in November, 1909, I was able to make arrangements with Mr. C. H. Totty, of Madison, New Jersey, to act as my agent in the United States for all the varieties of chrysanthemums distributed from Merstham.

Mr. Totty is a man who combines great business capacity with sound, practical knowledge of horticulture. Like most of the foremost growers whom I met in the States, he is an Englishman, having been born in Shropshire. He owns extensive nurseries at Madison, where one may see the finest glass houses, the most modern appliances, and the latest labour-saving devices to be found anywhere—and that is saying a great deal when one is speaking of America. The produce raised by Mr. Totty finds a ready market in New York, about thirty miles away. He has gone in very enthusiastically for chrysanthemums, and has built up a reputation as a successful grower, not only of commercial kinds, but also of exhibition varieties. A near neighbour of Mr. Totty is Mr. W. Duckham, who manages the estate of Mrs. D. Willis James, of Madison. Chrysanthemum lovers in America are under a debt to Mr. Duckham, who, for years past, has spared neither trouble nor expense to introduce the latest and best novelties. Some of the most popular varieties to be seen at the principal exhibitions in the United States at the present day have become known through Mr. Duckham's enthusiasm. Like his friend, Mr. Totty, he first saw the light in the Old Country, being a native of Plymouth. He left England for America nearly twenty years ago, and through his wide experience of gardening, sound judgment, and go-ahead methods he occupies a front-rank-place in the horticultural world of the States.

I have alluded to the great success of the Wells-Pockett

varieties of chrysanthemums in America, and, of course, it is unnecessary to tell English readers of their popularity at home. In this connection it may be useful and interesting to place on record some particulars as to the raising of these specimens by Mr. T. W. Pockett in Australia.

Mr. Pockett left England for the Southern Continent in 1878. For some years before that date he had been employed as a lad in the gardens of Ireton House, Cheltenham, and the first well-grown chrysanthemums which he saw were staged at the local shows. At that time—between 1871-3—the principal exhibits among the large flowering varieties were the "Christines," in the medium-sized Julia Lagravere, and among the pompoms Cedo Nulli and its sports. He was entrusted with the duty of looking after about four dozen different kinds, and this was considered a large collection in England in "the seventies."

Within a couple of years of his arrival in Australia, Mr. Pockett began to experiment with a few old varieties of chrysanthemums, which he obtained from one of the nurseries, but he made very little progress until he got Golden Dragon, Grandiflorum, and, later on, E. Molyneux and Lady Lawrence. The last-named caused quite a sensation as specimen plants, and also as cut flowers. As the years went by Mr. Pockett turned his attention to the production of new varieties, the sunny climate of Australia being particularly favourable to raising novelties from seeds. In a letter to me on the subject, written in 1909, he said, recounting his early efforts:

"A lot of time was taken up with raising seedlings from that hirsute chrysanthemum, Mrs. Alpheus Hardy. The result was chiefly bad constitutioned and invariably smooth petalled varieties. Another set of experiments was with perfumed sorts, which at first promised well; but owing to the fact that any pleasing perfume was associated every time with certain colours that were not likely to be popular, and as there appeared to be great difficulty in crossing and re-crossing so as to get pleasing perfumes in white, yellow, or crimson flowers, I was com-

pelled to abandon the idea, and to endeavour to raise types and colours that would comply as far as possible with public taste and requirements.

"The first batch of popular sorts contained Nellie Pockett, still a favourite everywhere. Then came W. R. Church, Mr. T. Carrington, Mrs. H. Partridge, E. J. Brooks, Lord Ludlow, Mary Inglis, W. Duckham, W. A. Etherington, Mrs. W. Duckham, Mrs. W. Knox, Mrs. J. E. Dunne, Miss M. Hankey, Wm. Gee, Mrs. J. C. Neill, Mary Mason, C. H. Totty, Frank Payne, Leslie Morrison, Rose Pockett, Pockett's Crimson, W. Hotston, Pockett's Surprise, Mrs. H. Stevens, Gladys Blackburn, Mrs. C. H. Totty, W. Mease, Alice Lemon, Mrs. R. Luxford, Howard Gould, (syn. Bessie G. Payne), Mrs. David Syme, Miss Alice Finch, and Miss E. King. Also the following incurveds: Mrs. Barnard Hankey, Pantia Ralli, Clara Wells, W. J. Higgs; and the decorative varieties, Market Red, Freda Bedford, Wells' late Pink, R. F. Felton, Hetty Wells, Foxhunter, Miss Muriel Smith, December Gold, and Clara Vurnum. A greater number of popular kinds might be mentioned, but I am quite prepared to state that, after taking into consideration the perfection of many of last year's seedlings, and the knowledge gained as a result of a number of systematic experiments that have been made during the last few seasons, the standard will be very much higher during the next few years."

While Mr. Pockett was experimenting with large Japanese chrysanthemums in Australia, Mr. T. Goacher, of Tunbridge Wells, was busily engaged in a similar way with early flowering varieties at home. By dint of perseverance he managed to obtain a number of excellent specimens of distinct colours, such as Goacher's Crimson, Polly, Carrie, Rosie, Jimmie, Lillie, Mrs. A. Thomson, Diana, Emily, Ethel Blades, Harrie, J. J. Hart, Wells' Scarlet, etc.

These "earlies" opened up a new field of endeavour and pleasurable occupation for hundreds of thousands of lovers of flowers—for the professional gardener as well as

the amateur—and since then almost every season has seen the introduction of new members to the great family of fairly large-sized chrysanthemums, of good habit, possessing the highly important recommendation that they come to perfection in the open air towards the end of the summer or early in the autumn. These numerous varieties raised by Mr. Goacher must be called early flowering doubles, to distinguish them from the early flowering singles raised and distributed by myself from Merstham.

Having referred to those who are principally associated with me in the important work of raising and distributing the newest and best varieties—in Australia, England, and America—it may not be out of place to say here that, for my own part, my whole time is spent among chrysanthemums. For upwards of forty years I have cultivated them and studied them, watching their growth and noting their innumerable interesting peculiarities. Born in 1848, at Lovell Heath, near Charlwood, on the borders of Surrey and Sussex, I was initiated into farming operations. But this was not quite to my taste, and I soon began to make acquaintance with the most ancient of all occupations in the gardens of Fen Place, Turner's Hill, Sussex, when I was still a youth in my teens. In the course of time the gardens were enlarged, and I felt very pleased with myself when I was entrusted with the work of laying them out and afterwards managing them. My career as a chrysanthemum grower began in 1869. In those days only two sections were recognised—the large flowered varieties, which were mostly incurved, and pompoms. The names of the favourites of thirty or forty years ago are of very little interest now, except for purposes of comparison; but I recollect that my first success was achieved with Miss Marechaux. This was shortly after I began business on my own account at Earlswood, in 1877. I grew as many of the variety called Elaine as I could house, and as soon as these were cut Mrs. G. Rundell took their place. The latter was followed by Miss Marechaux, a large, late, white incurved variety, which I grew in 8-in. pots—three plants in a pot. They sold at

remarkably good prices. Both Mrs. Rundell and Miss Marechaux had all been disbudded to one flower on a shoot, and I believe that this was the beginning of disbudding blooms for market. Anyway, through the surprising popularity of these flowers I had applications for cuttings from market growers in all parts, and I set out to supply the trade, restricting my efforts in this manner for some years. Then, gradually, I went in altogether for growing and distributing chrysanthemums—not only to the trade, but among gardeners and lovers of the "Queen of Autumn" generally, at home and abroad.

The results of the experience I have gained in this, the chief business of my life, are contained in the pages of this little book, which I hope and believe will prove of value to all who are interested in the most fascinating of all gardening pursuits—the Culture of the Chrysanthemum.

W. WELLS.

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THE CULTURE
OF THE
CHRYSANTHEMUM

CHAPTER I.

THE FIRST CHRYSANTHEMUM IN ENGLAND.

The story of the introduction of the chrysanthemum into Europe has been frequently told, with more or less accuracy. As might, perhaps, be expected, the early records are meagre and somewhat vague. The eighth edition of Philip Miller's great work, the "Gardeners' Dictionary," mentions that he cultivated the *Matricaria indica* at Chelsea in 1764, and this is claimed to be the first appearance of the flower in this country. It was received from Ningpo in China, where at that time it was known to grow plentifully. But there is good reason to believe that this plant was a kind of pyrethrum, and not a true chrysanthemum at all.

In 1789 M. Blancard, a merchant of Marseilles, brought home three varieties of chrysanthemums from China—a white, a violet, and a purple—but he only succeeded in propagating one, the purple. Three years later a French botanist named Ramatuelle sent about one hundred plants raised from the new chrysanthemum to the Jardin des

Plantes, at Paris, where they flourished. This had the result of popularising the strange but lovely Eastern flower, and within a few years chrysanthemums were to be found growing in gardens in Aix, Marseilles and Toulon as abundantly as the China aster.

Cultivated in England.

It was not until several years later, till 1795, that the history of the chrysanthemum began in England. It is recorded in the "Botanical Magazine" for February, 1796, that in the previous November a handsome chrysanthemum of the crimson-purple variety flowered in the nursery of Mr. Colvill, of King's Road, Chelsea. The variety was probably precisely the same as that which M. Blancard introduced direct from China at Marseilles. A coloured engraving of the bloom was given in the "Botanical Magazine," and was described under the name of *C. indicum*—although, as a matter of fact, *C. indicum* was classified as a yellow before Mr. Colvill's crimson-purple flower attracted attention in 1796, and is still known as a yellow chrysanthemum. But I cannot stop to dwell at length upon this point; any reader who is curious to learn what the experts had to say regarding *C. sinense* and *C. indicum* will find the opinions of Sabine, Lindley, and others summarised in "The Gardeners' Chronicle," November, 1889.

Between 1795 and 1808 about eight new varieties were imported into England from China—namely, the rose, the buff, the golden yellow, the quilled yellow, the sulphur-yellow, the Spanish brown, the quilled white, and the large lilac. At this period chrysanthemums were so popular in Japan that they were cultivated in almost every garden. In 1816 was introduced the tasselled white, and in 1817 the superb white. In 1822 there were in cultivation in Great Britain 22 varieties; in 1824, 27; and in 1826, 48—four of which were sports which originated in England. All the others were, however, believed to have been introduced from China.

Chrysanthemum Indicum.

(*Natural size of Spray and Flower.*)

Japan's Favourite Flower.

Mr. Robert Fortune, a gentleman who had travelled a great deal in China and Japan, found that everywhere the chrysanthemum seemed to be the favourite flower. He described how in 1860 he saw for the first time those peculiar forms of the flower which are cultivated in Japanese gardens. At Yedo, where the finest kinds were grown, and where he procured about thirty different varieties, he discovered that many of them had their blossoms most curiously and remarkably formed. The colours, which were brilliant and very unusual, were altogether distinct from those he had met with in China. Out of the thirty varieties only about twelve or fifteen were brought to England "alive," and from one or more of these Mr. John Salter, of Hammersmith, seems to have saved some seed. From this seed Mr. Salter raised a large number of new kinds of chrysanthemums differing in form and colour from those from which the seeds were saved, but similar to those which were lost on the way home to England from Japan. The result does not seem to have been obtained by hybridising, for the simple reason that the pollen of the kinds produced could not have been obtained in Europe. Mr. Fortune declared that if one was in possession of one variety only it might be made to reproduce all the varieties in cultivation from whence it came, and that flowers would be produced not only different in colour from the parent, but entirely different in form also.

Between 1830 and 1850 several varieties were raised from seed saved in England and France. Amongst the latter were the well-known Christine and Chevalier Domage, and in 1848 there appears to have been an anemone flowered variety called Nancy de Lermet—white tinged with blue. And ever since then the real blue chrysanthemum has been more a matter of conversation than of fact. But this may come yet. Who at one time would have thought of seeing a green chrysanthemum, especially in a sport, and afterwards as a seedling? Then why not a blue chrysanthemum? But this is by the way.

The First Chrysanthemum Show.

About the time that Nancy de Lermet was raised, according to Mr. Fortune, the chrysanthemums in this country were far superior to those in China, and this despite the fact that they met at first with scant favour in England, though it was otherwise in France, where many beautiful varieties soon appeared.

From the inception of the Stoke Newington Show long strides have been made, both as regards varieties and cultivation. The earliest chrysanthemum show in Great Britain was that held at Norwich, about the year 1829, and although no prizes were given it was considered to be a rather rash undertaking. Some of the varieties exhibited at Norwich were Early Blush, Curled Lilac, Semi-double Quilled Pink, White Quilled, Tasselled Yellow, Parks Yellow, Purple Quilled, Tasselled Lilac, Changeable Pink Buff, Changeable Pale White, Changeable Purple, Spanish Brown, Quilled Orange, Two-coloured Red, and Early Crimson. What's in a name?

Varieties Then and Now.

I need not dwell upon the old varieties, or those which were introduced for some years afterwards, but I will give the names of some of the best varieties which were to be seen in England in 1890—and it is a remarkable fact that out of the varieties which were so popular at that time not one is to be found on the Show bench at the present time. The best thirty-six varieties in 1890 were as under:—Avalanche, Carew Underwood, Boule d'Or, Belle Paule, Baronne de Prailly, Comte de Germiny, Elaine, F. A. Davis (Jeanne Delaux), Edwin Molyneux, Golden Dragon, H. Cannell, Japonaise, L'Adorable, Lady Lawrence, Etoile de Lyon, Mdm. B. Pigny, Mdm. Bacco, Mdm. J. Laing, Mdm. C. Audigier, Mdlle. Lacroix, Marsa, Mons. Bernard, Mons. Freeman, Mrs. Wheeler, Mrs. J. Wright, Meg Merrilless, Pelican, Ralph Brocklebank, Sarah Owen, Sunflower, Stanstead White, Soleil Levant, Val d'Andorre, W. W. Coles, Thunberg, Stanstead Surprise, etc.

Twenty-four of the best incurved chrysanthemums in 1890 were :—Princess of Wales, Mrs. Heale, Violet Tomlin, Mrs. S. Coleman, Miss Haggas, Empress of India, Alfred Salter, Golden Empress, John Lambert, Lord Alcester, Queen of England, Refulgens, John Salter, Prince Alfred, Lord Wolseley, Jeanne d'Arc, Jardin des Plantes, Hero of Stoke Newington, Princess of Teck, Chas. Gibson, Nil Desperandum, Barbara, Mrs. Geo. Rundle and Mrs. Dixon.

Only a very few of the foregoing plants are now in cultivation, the reason being that none of them will compare with the prize-winning varieties of the present day.

In 1895 the incurved section was enriched by C. H. Curtis, Mrs. R. C. Kingston, Baron Hirsch, Mdm. Darrier, J. Agate, Mons. R. Bahuant, etc., while during the same period the Japanese made such strides that larger show boards were considered necessary. And for the vast improvement which was made much of the credit must be given to Mons. E. Calvat, of Grenoble, who at that time gave a stimulus to the chrysanthemum trade. Although other growers were doing their best, their whole efforts combined could not compare with M. Calvat's. But, naturally enough, a large number took up the running—such as Weeks, N. Molyneux, Penford, Mileham, Silsbury, Bryant, Tanner, and other amateur raisers in Great Britain, in addition to members of the trade, and Pockett in Australia and others in different parts of the world, so that it is not surprising that so many varieties are introduced each year. And as it is only natural for each grower to look upon his own production as superior to that of others, it can be easily understood why so many varieties get into circulation.

Among the Japanese varieties which were considered unsurpassable in 1895 were the following :—Mdm. Carnot, Mons. Panckoucke, Mons. Chenon de Leché, Edwin Molyneux, V. Morel, Chas. Davis, Mdlle. M. A. de Galbert, Col. W. B. Smith, Baron de Buffieries, John Shrimpton, Phœbus, Mdlle. Theresa Rey, Louise, Le Moucherotte, Mutual Friend, Mrs. C. H. Payne, Mrs. W. H. Lees, Mdm. M. Ricoud, Thos. Wilkins, Miss Dorothy Shea, Vicountess

Hambledon, W. Seward, Mdm. Ad. Chatin, Deuil de Jules Ferry, Beauty of Castlewood, Souvenir de Petite Amie, Rose Wynne, etc. It will be found interesting to compare the foregoing chrysanthemums with the list of the most popular varieties at the present day as set forth at the end of this book.

Popularity of Chrysanthemums.

And here let me remark in passing that from time to time articles are published or speeches are made in which the writer or speaker proves apparently to his own satisfaction that the chrysanthemum trade is on the wane, and that the flower is declining in favour. But this is not my experience; indeed, the contrary is the case. For every two or three traders who fail, a score of new-comers are to be found joining the ranks of professional growers, and the amateurs are an ever-increasing army! I do not pretend to be a prophet, but I venture to say, looking to the future, that the popularity of the chrysanthemum will not die. The flower comes to perfection at a period of the year when no other flower, procurable at such a trifling outlay, can be obtained to fill its place.

Enthusiastic Amateurs.

As regards the early flowering chrysanthemums, immense strides in their cultivation have been made, for up to 1889 there were very few good varieties. Comprised in the best were :—Mdm. C. Desgrange, St. Crouts, Nanum, Little Bob, Fred Pele, Precocite, Flora, Mdm. Jolivart, La Vierge, Lyon, Blushing Bride, Mrs. Burrell, Mrs. Hawkins, Alice Butcher, Anastasia, and a few others. But the late Mr. W. Piercy took up their culture, and about the year 1889 he wrote an article upon them, in which he remarked: "We want a few more enthusiastic amateurs, and any spare money we can get, for these are the things to help on the progress of these early varieties, which appear capable of boundless extension." There never was a more accurate forecast. At that time, too, the late Mr. Russell, of Mytchett, Farnborough, Hants, was directing

his attention to the early varieties, and introduced a lot quite superior to any others then in existence, nearly all of them being recognisable by the name of Mytchett, viz., Mytchett White, Mytchett Beauty, etc.

Recently, Mr. Goacher has raised varieties of good constitution, which flower freely and bloom from the beginning of September onwards, included in the number being Goacher's Crimson, Carrie and Polly. Among the French growers M. Aug. Nonin, and others, have turned their attention to the earlies, and sent us some of the best whites —Roi des Blancs, Tapis de Neige, Savoie, etc. A few good earlies have also been sent out by Mr. Smellie, the most noteworthy being Hector. I have myself raised a large number at Merstham, but despite all this, my ideal white among early flowering chrysanthemums has not yet been produced.

CHAPTER II.

CHRYSANTHEMUMS FOR EXHIBITION.

In the following chapters I propose to treat on the best and most up-to-date methods of growing the chrysanthemum, whether for exhibition, decoration, or market; but as the first-named stands out from the rest both in respect of the skill required and in the perfection of bloom produced I shall take this section first.

Growing for the Show Bench.

In growing chrysanthemums for the Show bench I shall give two distinct methods, and shall endeavour to keep each to its own chapter. In following the first method, whereby two, three, and even four blooms for exhibition are produced on the same plant, it is essential that the cuttings should be inserted during December and January if they can be procured. The soil should consist of equal parts of loam, sand, and leaf-mould. Sprinkle a little coarse sand on the top of the compost, so that some may trickle down when the holes are made into which the cuttings are inserted. Put three or four cuttings round the edge of a 4-in. pot, press firmly, and sprinkle with a little water to settle all well about the heels of the cuttings. Place them in a greenhouse in hand-lights, or boxes just deep enough to allow of squares of glass being laid over them, to retain the moisture whilst rooting is being accomplished.

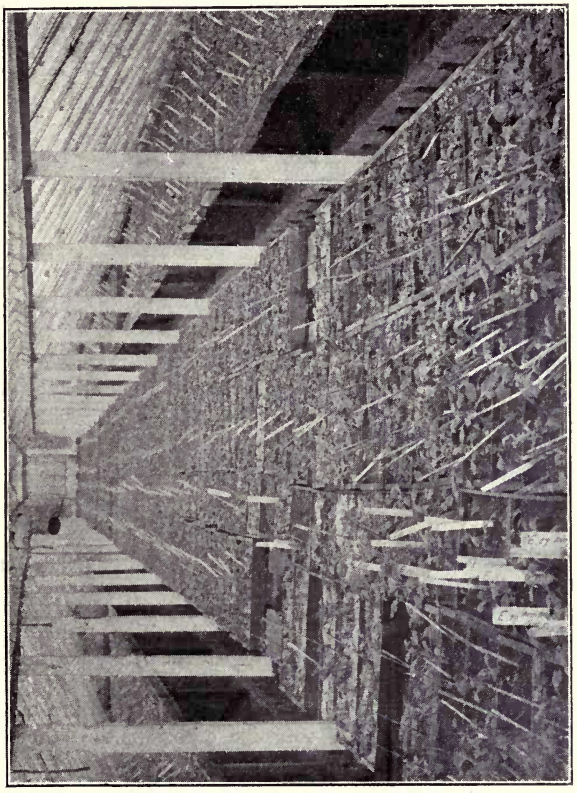
Take cuttings of all the *late* flowering sorts first, if they can be had. I prefer those which have a clean growth of four or five inches from the ground, taking their tops about two or three inches long, to those which have been grubbed up out of the ground, even if they have roots to them. The former cuttings make plants sooner, and have a cleaner growth—(cuttings from the stem often throw premature flower buds).

The cuttings will require to be sprayed occasionally, at about ten or eleven o'clock, so that they may get tolerably dry by evening. They will not require watering otherwise till they are rooted, which will be in three or four weeks. The temperature should be from 45 degrees by night to 50 degrees by day. It is advisable to be a little below than above this temperature, and the less fire-heat employed the better. At one time I used to root cuttings in cold frames, but long experience has taught me that it is not always

A Good Cutting.

safe on account of severe frosts. Some growers become very anxious if certain sorts of cuttings cannot be had at a given date, but this need not be, as I will show by the method of stopping (*see* Chapter III. on "Stopping"). As soon as the cuttings show the least sign of growth, the glass should be tilted for a day or two in order to harden them, and then taken off altogether. They should then be removed from the box or frame, and given plenty of light and air, so as to keep them from growing too fast and becoming drawn.

When the cuttings are nicely rooted, before the roots get entangled all round, knock the plants out of the pot



One of our Propagating Houses; 50,000 cuttings.

and divide them carefully. Hardly a root will be broken. Pot them into clean 3-in. or 4-in. pots, crocked with old mortar rubbish or oak leaves.

The First Potting.

Soil: One bushel of good loam (that in which cucumbers have been grown the previous year will do), one quarter bushel oak or beech leaves twelve months old, one quarter bushel old mortar rubbish sifted fine, a quart of ground bones, and half a gallon of coarse sand. Failing the ground bones, use one quarter bushel of very old rotten manure, but nothing to cause rank, sappy growth. Pass the whole through a ½-in. sieve; and the coarser portion of the soil may be put into the bottom of the pots for drainage. I very rarely use a crock at the bottom of small pots. Make the soil moderately firm with the thumbs. Rig up a frame close to the glass (an old door will do), put a thin layer of ashes or sand upon it, and stand the newly-potted plants on this. Sprinkle them overhead once a day, or twice in very sunny weather. If the sun is very bright, they may want shading for a few days, but not otherwise. Keep them close for a day or two; then give them all the light and air possible, but no fire-heat if you can manage just to keep them above freezing-point without it. Fumigate or dust them with tobacco powder on the first appearance of aphis.

When the Plants are Rooted.

As soon as the plants are beginning to root nicely, the best place for them is a cold frame, for by this time the sun will have sufficient power to admit of them having a little air each day, but cover them at night with mats if frosty, leaving just a chink of air when the thermometer is above 40 degrees. A sheltered spot should be selected, so that they may get no cold, cutting draughts; but air should be given on all favourable occasions. If the wind is at all keen, tilt the lights a little on the opposite side to that from which the wind is blowing; or use hurdles, or boughs—in fact, anything that will break the wind; but the plants should have air if the thermometer is above 40 degrees in the day. They must not be crowded at any time, but should stand clear of each other. From the

middle to the end of March, the tops—only just the point, say, half-an-inch—may be taken out of the very late varieties (*see* "Stopping"). A week after this they will be ready for shifting into 6-in. pots. This should be about

Plant making the first break.

the end of March or first week in April. *Do not stop any plants at the time of potting.* Either stop them a few days before, or leave them until they have been potted a week.

Potting into 6-in. Pots (or 32's).

Soil: To every bushel of good, yellow, fibrous loam, which has been cut six months or more and chopped about the size of walnuts, add two gallons of leaf mould, two gallons of rotten manure, two gallons of old mortar rubbish or charcoal, not larger than nuts, and two gallons of wood ashes, half a gallon of ground bones, and half a gallon of coarse sand. The latter need not be added if the loam has plenty of fibre in it. If mortar rubbish cannot be had, add more sand, but sand has not the nourishment that old mortar rubbish contains. This quantity will be sufficient for about fifty plants. Commence by putting one good-sized crock, hollow side down, over the hole of a *clean pot*, and cover this with a layer of old mortar rubbish about the size of nuts to the depth of about three-quarters of an inch, then fill in another layer of the roughest or turfy parts of the soil. Ram this pretty firmly with the blunt end of the potting-stick; sprinkle a handful of finer soil loosely over this for the roots to rest upon; turn the plants out of the 4-in. pots by giving them a tap on the bench, catching them with the left hand; and then stand each one in the centre of the pot, and with the crown fully *half-an-inch below the rim of the pot.* Hold the plant in position until sufficient soil has been put in to keep it upright, ramming it gently and evenly all round until the pot is filled level to the crown of the plant, not more. Be careful that your stick is not too wide, and do not punch too closely to the old ball, or with one punch you may cut through the roots all down one side. This will bruise every root, and the plant will take some time to recover.

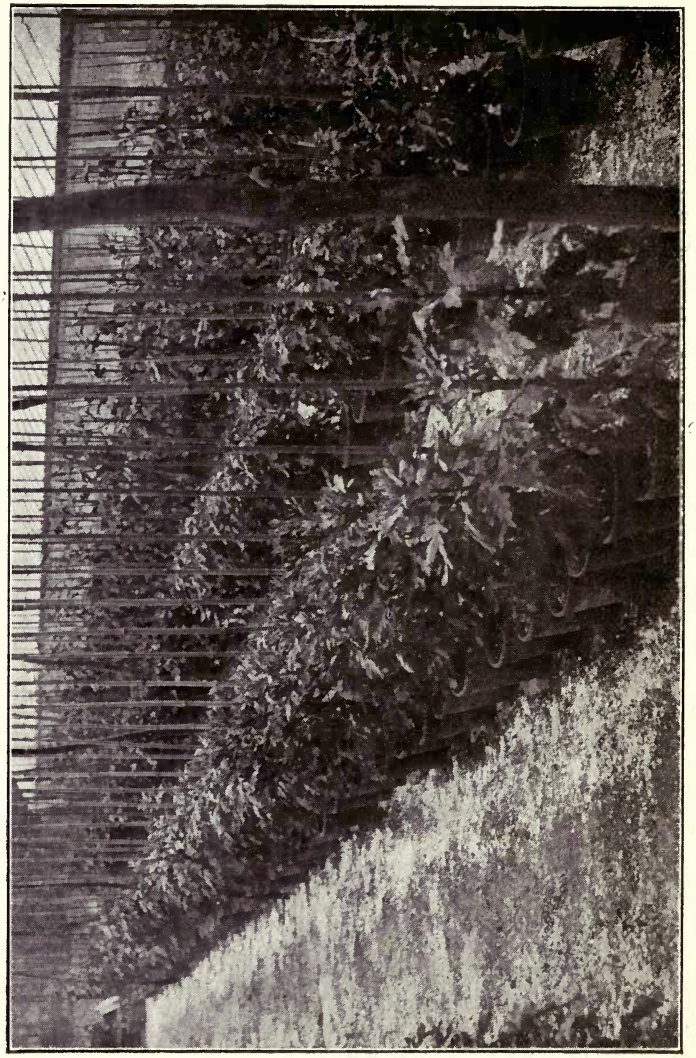
Hints on Watering.

Some growers shade their plants after this potting, but if the operation is carefully done shading is unnecessary. Sprinkling the plants once or twice daily will be all that is required for a few days. The plants should be returned to the frames after this shift, and may be kept a little close for a day, to keep the wind from blowing directly

upon them; otherwise they should have all the light and air possible, and plenty of room allowed them. They should not be watered for a few days after potting, but be kept from flagging by just sprinkling them overhead very lightly, but not after 2 p.m., or they will not get dry before night. They should be watered the first time sufficiently to soak the ball through, a rose being used on the watering-pot. Do not go over them all a little, and then round again, as this will make the soil muddy. After this watering the pots should always be tapped with the knuckles to ascertain if the plants are dry; and if this prove to be so, give them sufficient water to go through the bottom. But on no account water them before they are dry, for on this careful watering depends the ripening of the wood throughout the whole growth.

One soon gets used to the sound of a dry pot. The old custom of watering chrysanthemums once a day, whether they want it or not, *will never ripen the wood properly, and will never produce good exhibition flowers.* It should be remembered that after the first watering they may not want any more for a week, and watering would only turn them yellow. But as soon as they get well rooted, some of them may want watering twice daily on hot, dry days, and they must have it, or they will take their revenge in November! Not one item must be neglected. The best of everything must be got for them, and the best attention given them. Then, depend upon it, they will reward you in the end.

Always avoid watering chrysanthemums late in the day when there is any sign of frost, for when the plants are full of water the frost takes more hold upon them than when they are dry. But while they are in the 32's they can be covered at night, for it is not safe to trust the English climate even one night. Some of the plants may want a stake while in the 32's, but do not use large or stout ones. Should the plants get too tall for the frame, put a brick under each corner. If they are well rooted, and the weather is wet and cold, it would be better to feed them a little than pot them into their flowering pots.



Pants in their summer quarters. Looking along the rows.

for as a rule they must be placed in the open after the final potting. A spell of wet weather would sodden the rich soil and make it sour before the roots could get hold of it, and if the leaves once began to turn yellow it would be a long time before the plants recovered. In fact, they would get such a check that they would feel it for the whole season. From the beginning of May the plants should be thoroughly exposed night and day, except when there is any appearance of a sharp frost. A rough framework of posts and slate battens with tiffany is a good covering in case of frost.

Preparation for Final Potting.

Early in May preparation for the final potting should be made by getting the soil ready. The next step is to see that sufficient pots are cleaned and in readiness, and that a good supply of old mortar rubbish, or crushed oyster shells, is prepared for drainage. The mortar rubbish should be run through a ½-in. sieve. The coarsest is used for drainage purposes, and the fine kept for mixing with the soil.

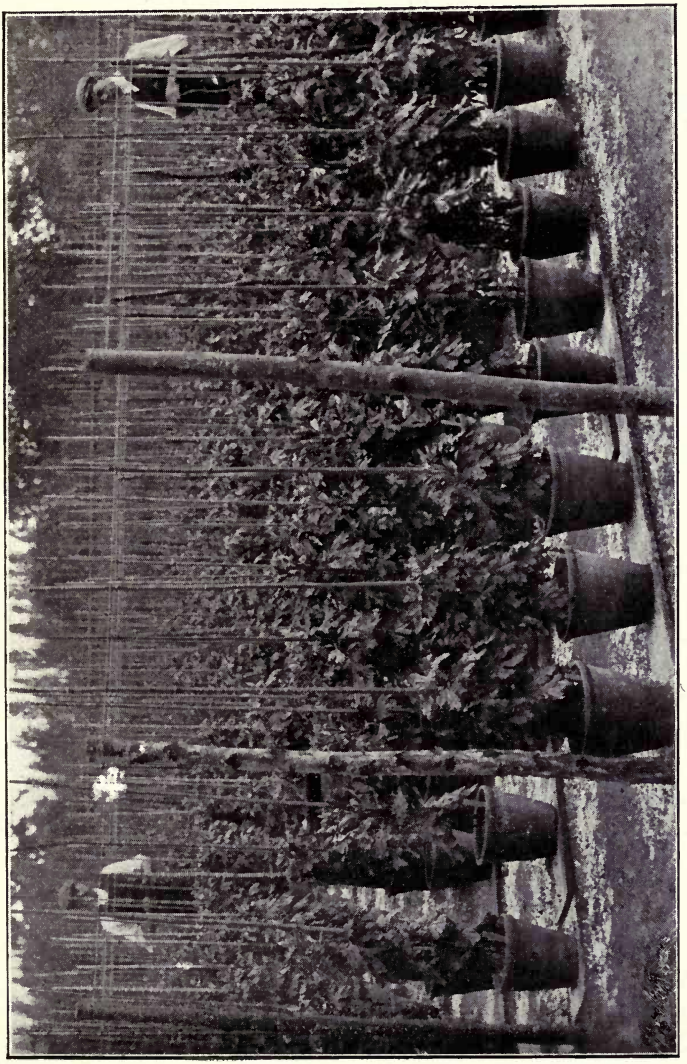
Final Potting.

Everything being in readiness and the weather favourable, a beginning may be made with the final potting about the middle of May, the strongest and best-rooted plants being taken first. A large clean crock or an oyster shell should be placed, hollow side downwards, over the hole, and then about an inch of old mortar rubbish or the broken oyster shells. I use the shells, if they can possibly be had, in preference to clinkers or crocks for two reasons; firstly, they form food for the plant; secondly, they need not be picked out when the old stools are thrown away, as they are also good for the garden. Upon the drainage put some of the roughest or turfy parts of the soil, sufficient to cover the crocks well, then some of the soil, and ram pretty tightly with the blunt end of the potting-stick (which should be one foot long, and about one-and-a-half

inches in diameter, with one end shaved to half an inch). Add loosely a little of the fine soil for the plant to rest upon, then turn the plant topsy-turvy, and give the rim of the pot a sharp tap on the bench, catching the plant with the left hand. Pick out the crock and all the rubble. Take care not to injure the roots, but spread them out, carefully resting the plant upon the soil.

The base of the stem should be quite an inch below the top of the pot, and in the centre. Hold it in position with the left hand until you fill in sufficient soil to steady it. Then gently ram the soil with the thin end of the stick, being careful not to cut any of the roots in punching, and continue to fill in and ram till you get the soil level with the base, after which with the blunt end of the stick press the surface down pretty tightly, so that you cannot make any impression with your thumb. If the soil is sufficiently porous, there will be no danger; but if your soil is very heavy and fibreless, it would be well to pot one of your worst plants first, and stand it out and water it to see if the water passes through all right.

I once made a sad mistake by telling the men not to be afraid of ramming the mould too tightly. The soil was heavy and had very little fibre in it. It had, moreover, been lying in a rather damp place, and the large pieces which they put at the bottom of the pots were too wet. They pounded it so thoroughly that the water could not get through, and not being at home to watch the proceedings, all that day's labour was wasted (*see* "Hints on What Not to Do"). Several trying seasons have taught me a lesson as regards putting chrysanthemums at once in their summer quarters after being finally potted. The weather has to be very carefully studied. A keen wind may strip off the leaves and give the plants a severe check. Many varieties turn quite yellow in the foliage, which eventually dies off leaving the stems quite naked, and this, as may be imagined, greatly retards development. So I advise standing them for a fortnight or so in a sheltered position, where they may be easily sprayed to prevent drying too quickly, and also be syringed with paraffin



Plants in their summer quarters. Looking across the rows.

mixture, a preventive against the leaf mining maggot and fungus. (*See* " Remarks on Fungus ")

Summer Quarters.

With regard to summer quarters for the 'mums, the sides of the paths in the kitchen garden are doubtless as good places as any, if there is plently of room *without the trees or vegetables shading them.* They may be stood just off the paths. Place floor-boards or tiles to stand the plants upon. A stout stump should be driven into the ground at each end, and also at intervals of 12 or 15 ft. along the row of pots, and a wire of medium thickness stretched from post to post at each end and about five feet from the ground. If the rows run north and south, the wire may be raised four feet at the south, and six feet at the north end, so that the shortest varieties of plants may be placed at the south end and the tallest varieties at the north, and thus allow the sun to shine over the tops of all. If the very tall varieties are stood together, it is as well to put two wires; or if the cultivator desires to tie his plants out each way they should have two wires. Do not use string, for it stretches and shrinks, and is almost sure to come to grief in September through wet and wind. Then there is all the work to do over again, besides having many of the buds broken off. If the plants cannot be stood up the sides of the paths, they should have a position where they would be well exposed to the sun all day. I may say that in our nursery at Merstham we have layers of concrete seven inches wide and four feet apart running north and south, so as to form a permanent position; but there are only very few growers who could spare the ground to do this, although concrete is cheaper and more durable than boards.

In standing the plants in their summer quarters, they should be at least 15 inches from plant to plant—more if possible. One good strong stake should be put to each plant when the row is completed—6-ft. or 7-ft. bamboos are the best. Bamboos are strong, and, lasting several seasons, are the cheapest. Besides, being slight they do

not shade the plants much, and, while they need no sharpening, they will not bruise the roots if carefully inserted. The stakes should be placed on the north side of the plant, so that they may not shade it at all, and each plant should be looped to the stake. The plants should be sprinkled over-head twice a day to prevent flagging after being newly potted, and this will keep them fresh for three or four days without watering; but do not syringe them after 3 p.m. When they are watered for the first time it should be done with the rose on, and sufficient water should be given to go through (or fill the pot, which will be enough), and they will not require any more for a few days. But keep up the sprinkling with very weak, clear soot-water once a day. The pots should be tapped with the knuckles when they look dry to make sure of the fact, and by no means give water unless they sound hollow. If they are over-watered at this stage the foliage will be sure to turn yellow, for the soil, being rich and firm, holds the water; but always when they are watered they should have sufficient to soak them through.

The First Break.

After they have made their first break the shoots should either be looped separately to the stake, or smaller sticks should be inserted and tied to the wire on each side, so as to allow each shoot to be attached to one stick. I have tried both these methods, but I really cannot see any difference in the flowers at the finish. As the tying out requires more sticks and extra work in tying, especially when the plants have to be taken indoors, and as the plants so treated do not look so nice, I do not think there is any preference to be given for the extra labour. Watering must be very carefully done throughout, always giving the pots enough when they want it, and not before. They should be looked over three times a day at least, and if the weather be hot and dry in July, four times. I have sometimes seen plants neglected very much, especially on Sundays, when they get what I call "flicked over"—when growers make a watering-potful go about three times as

far as it ought to go. This is terribly deceiving, and unless the operator is caught in the act you would not think of it. The sooner such persons get notice to quit the better it will be for the gardener, for it is hardly necessary to remark that such men do not take an interest in their work. I have also seen men when watering, and when within five or six plants of the end of the row (and perhaps with only sufficient water in the watering-pot for two plants), eking it out for the lot rather than go for more.

Soot-Water and Paraffin.

It is a good plan to syringe the plants with clear soot-water with a little "Homco" or "Abol" ("White's superior insecticide") once a week; it keeps aphides and thrips at bay, and they are the best preventives against mildew and fungus. As a matter of fact these agents are so cheap growers do not reckon them at half their value. Soot is valuable as an insecticide as well as a stimulant. When plants are in process of full development and a spell of dull weather sets in, the growth will be very tender, and watering must be most carefully done. For if the sun and wind play upon them afterwards the tops will lop like rags. But do not be deceived and think they are dry. Tap the pots to make sure. A "tickle" with the syringe may be much more advantageous to them than a dose of water at the roots; for it is by careful watering only that the wood is thoroughly ripened and the foliage kept from dropping off, or enticing mildew or parasites.

The Second Break.

Now, supposing we are in the middle of July and all essential details have been attended to—watering, tying the shoots, keeping all superfluous growths pinched out, etc.—plants which are intended to produce second crown blooms will be making their second breaks. Three shoots may be left on each for a few days. When three inches long take out the worst of these; and when six inches long take out the worst again—thus leaving but one growth to each

shoot, or three shoots to each plant as before. By that time the plants will be well rooted, and may be given very weak stimulants, beginning by only just colouring the water, and changing the diet every week, or oftener if possible. There are so many good manures that it is no trouble to give the plants a change; but the best manures at this time are those that will afford the plant something to feed upon—such as soot, or sheep, horse, cow, chicken, or pigeon droppings put into a coarse bag and immersed in a tub, which should be kept filled with water. A little of this in the watering-pot every alternate day, or three times a week, is far better than a stronger dose once a week. Then there are Clay's and Barnes' manures, which are advertised in this book. A mixture may be made in the proportion of one gallon of manure to one bushel of fine soil, and a small handful may be sprinkled on the top of the pots by the end of July, but the same chemical must not be used twice in succession. The roots will have become pretty greedy by this time, as they will have practically exhausted the soil, and they must, therefore, have something to keep them going. I do not believe in waiting until the bud is secured before commencing to feed, for the plants will have already made their growth. To withhold nourishment from them at this stage would be like starving a boy when he is growing and wants plenty of food, and trying to make it up to him when he arrives at manhood. One must study Nature in everything, and, depend upon it, Nature is always right!

Securing the Buds.

About the middle of August many of the plants of the Japanese varieties will be showing buds. It would not be safe to let them make another break after that, or the blooms would be late and show a large eye in many instances. The mid-August buds should, therefore, be secured, and should the buds appear a week or so before the middle of the month, one or two growths may be

left for a week or so, towards the top, to retard the bud. Amongst the incurveds—C. H. Curtis, Duchess of Fife, Clara Wells, and a few others—the buds may be secured by the middle of August, as they have so many florets; but the majority are best not secured earlier than from the 20th to the 25th, or they would be too early. They may

Crown Bud Terminal Buds

be retarded a little by leaving a shoot at the side of the bud for a few days to draw the sap from the bud, as with the Japanese. The best incurveds are those secured at the end of August.

A Good Dressing.

Now, supposing we are at the end of August, or the first week in September, and the buds are all secured. It

would be safe to give a dressing of nitrate of soda; *but be very careful with this.* Mix one pound of nitrate in two gallons of water, dissolving every particle. Then to every two gallons of water add half-a-pint of the nitrate liquid, the proportions being half-an-ounce of nitrate to two gallons of water. This will be quite strong enough, and before using it be careful that none of the plants are quite dry. The whole of the plants may be watered with the solution if their buds have been secured. This dressing may be repeated in about a fortnight, *but not after the plants are housed,* for it has a tendency to cause damping. Continue to use other stimulants—farmyard manure, or something else that will enrich the soil, for nitrate does not do this. Nitrate is merely stimulating, like brandy to an exhausted man; but "Farmyard" is really food, like beef-tea.

Housing the Plants.

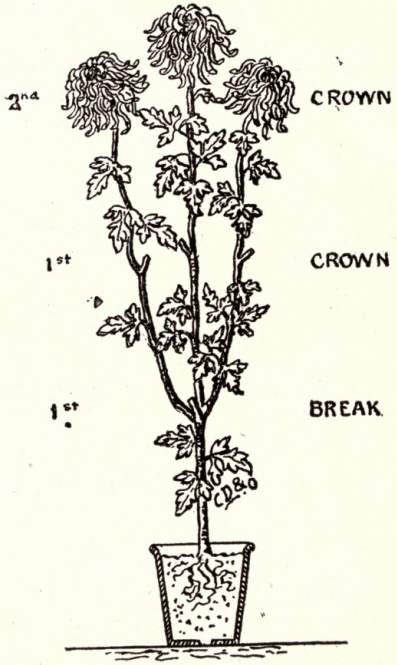
Well, we are, say, in the last week of September. Everything that can be done for the plants' benefit has been done. All earwigs (that could be found) have been killed; all mildew checked; all side-shoots cleaned off, etc. Now the houses should be *painted or cleaned, and made drip-proof.* If a house is standing by itself and can be thoroughly emptied, some sulphur may be burnt in it. This kills everything; but if it join other houses, or the dwelling house, then sulphur will not do; for it not only kills plants, but tarnishes pictures, plate, etc., as well. But, above all, see that the houses are drip-proof.

All plants should be housed by the end of September, for the simple reason that they are not safe out of doors after that; and as they begin to show colour they should be slightly shaded.

CHAPTER III.

STOPPING CHRYSANTHEMUMS.

By stopping, I must be understood to mean pinching out about half an inch of the soft growth from the point or



Plant Stopped for Second Crown, showing the breaks.

apex of a shoot. The sole object of stopping exhibition varieties is to secure an earlier break than the plant would

make naturally, so that it should be forced to bear flowers of the greatest perfection one, two, or three weeks earlier than it would do by allowing it to make its breaks in its own natural way. Unless the cultivator's object be to produce large exhibition blooms and have them in perfection by a certain date the stopping (or "timing" as it is often called), is absolutely unnecessary, for all chrysanthemums will flower at their usual time if unstopped.

Stopping does not mean cutting or pinching off two, three, or more inches of the top, but, as I have said, merely taking out just the leading point, or say half an inch, which compels the shoot to make a break much earlier than it naturally would, and this break brings about exactly the same result as the natural break would. There are so many different types or sections of varieties, even among the Japanese, that one might write a book upon this one point of stopping only. But I will name a few of the very best varieties, the different methods of timing them, and the buds preferred, so as to have the blooms at their best by the first or second week in November in the South of England. Growers in the Midlands or in the North should stop their plants earlier, or in many cases secure first crowns. (*See* "The Best Japs for Exhibition.")

Varieties Improved by Stopping.

I will describe a few varieties which are improved in colour and form by stopping. Among the number are Algernon Davis, F. S. Vallis, H. Perkins, Lady Hopetoun, Marquis of Northampton, Mdm. P. Radaelli, Mdm. G. Rivol, Mrs. F. W. Vallis, Reginald Vallis, V. Greenham, and W. A. Etherington. These are a few of the sorts which, if rooted early, may be stopped by the end of March, or early in April, in the South of England. It is desirable to lead up only one growth from the resulting break to the next break (*see* Plate with one shoot), which should show by the end of June. If, however, the second break does not appear by the beginning of July, I would advise taking out the point. From this break three shoots should be taken

up. The buds at the top of these would be second crowns, and should appear from the 15th to the 20th of August.

A Plant Stopped early in April, and one shoot only allowed to grow.

These buds should produce large flowers, and show better colour than would be procured from natural first crown

buds. It would be safer, however, in order to take no risks as regards the weather, to treat a few plants in

A Plant Stopped early in April, and three shoots left to grow.

different ways—*i.e.*, a few plants should be grown on natural first crowns, and a few others as described above.

But let it be distinctly understood that growers who have weakly plants should never practise stopping, for stopping has a tendency to check the growth. Therefore, unless a plant is in good health and thoroughly established, it would be better to allow it to grow on and gain strength. My object in recommending early stopping is that the plants may not subsequently receive any check, for the best flowers are generally those which are produced on the top growths. In a word, unless flowers are required by a certain date—as, for instance, for exhibition purposes—stopping is absolutely unnecessary.

There are many ways by means of which the professional gardener can time his chrysanthemums, the principal method being, of course, to insert cuttings at certain dates. But no man can control the weather; neither can he ensure that all his cuttings will grow nicely and make their break at a stated time. In order to know the peculiarities of different varieties, one has to grow them a season or two, and even then some men will succeed with particular varieties better than others. It is these cultural peculiarities which make chrysanthemum growing so interesting.

For beginners I should advise a selection from the easy growers, or natural second crown varieties, as they do not require the expert knowledge which is essential in the case of other plants, and after a season's handling the enthusiast will learn all that is required to be known about first breaks, first crowns, second crowns, and terminal buds; in fact, the cultivation of the "Queen of Autumn" will become as easy as "falling off a log."

Suitable for Beginners.

The group of chrysanthemums styled "second crowners" are the most reliable for beginners, because they make their breaks easily, and by tampering with them one is more likely to throw them back than anything. A few of the best varieties are Geo. Mileham, 1908, Lady Talbot,

Mrs. C. H. Totty, Mrs. J. C. Neill, Mrs. J. E. Dunne, Mrs. L. Thorn, Mrs. N. Davis, Mrs. W. Knox,

A Plant after it has made a natural break. The next buds which show will be First Crowns.

Pockett's Surprise, Rose Pockett, Splendour, and W. Beadle.

In addition, there is the group of first crown varieties (*see* Plate), which make only one natural break in the South. In the North of England and Scotland the cuttings must be inserted early, otherwise they have to be stopped in May. A few of the best are as under :—Bessie Godfrey, Dennis Kirby, Dorothy Gouldsmith, Duchess of Sutherland, Frank Payne, Mrs. A. G. Pirie, Mrs. Geo. Mileham, Mrs. H. Barnes, Thrumpton Pride, and Walter Jinks.

Some writers declare that certain varieties should make their break on stated dates, and that the buds should be secured at a specified time. This may be, of course, if the weather and other conditions are favourable, but not otherwise. When a bud shows a little too early it may be temporarily held in check by retaining a few of the top shoots for a while, but not until the shoots get so hard that one has to use a knife to cut them off. In that case it will be found that they have been taking the strength from the buds. Any plants which do not show the bud by the required time may be watered with water at a temperature up to 100 degrees, although this method should only be resorted to in very extreme cases, and should be employed when the thermometer is at the highest point on hot days.

CHAPTER IV.

CHRYSANTHEMUMS IN 6-INCH POTS.

Dwarf chrysanthemums are now grown in all parts of the United Kingdom, and in recent years so many naturally dwarf varieties have been raised that it would be an easy matter to form a large group composed of plants none of which stand over four feet, while the front could be faced with plants from 18 to 24 inches high in 6-inch pots.

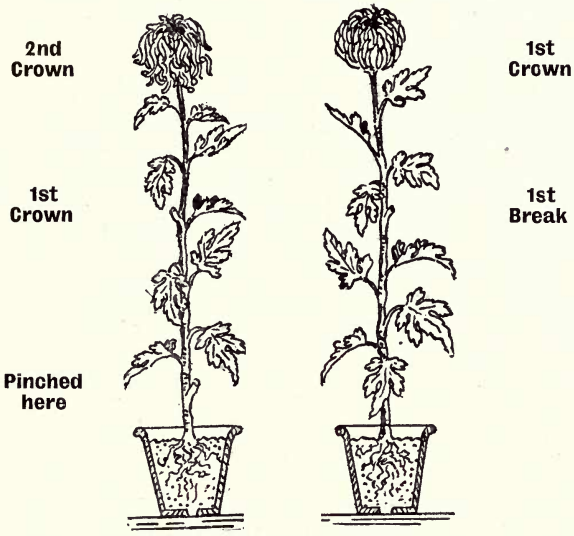
Methods of Culture.

There are a number of methods which may be pursued in the production of these handsome dwarf specimens. The first is to insert the cuttings at the beginning of April, in boxes, so that a square of glass can be laid over them to keep them close until rooted (a herring-box is a capital thing). The box may be placed in a greenhouse or cold frame. Fill it half-full of soil, the same as that recommended for cuttings (see Chapter II.), and dibble the cuttings in lines, with a small label to each. As soon as they are nicely rooted, pot them off into 3-in. pots. When they are six inches high take out the point to make them break, and when the pots are well filled with roots (which will be towards the beginning of July), a shift should be made into 6-in. pots. Pot tolerably firmly, using the same kind of soil as recommended for final potting. One shoot only should be allowed to grow, and the next bud which appears should be secured from such kinds as Algernon Davis, Beatrice May, Chs. Beckett, Frank Payne, F. S. Vallis, Hon. Mrs. Lopes, John Peed, Keith Luxford, Lady Talbot, Leslie Morrison, Mrs. A. T. Miller, Pockett's Crimson, W. A. Etherington, Walter Jinks, W. Howe, and W. Mease.

Another method of producing dwarf plants—and perhaps the best way of all—is to secure some of the top

A Plant of Master James in a 6-inch pot

shoots from the exhibition plants after they have made their first break in May. When they are two or three inches long put them singly into small pots, keeping them close until rooted; then harden off, and treat as previously directed. Any plants which produce their flowers on second crowns may be stopped when six inches high, but if they are first



Plants growing in 6-inch pots.

crown varieties they will not require to be stopped, all that is necessary being to secure the first bud which shows.

Some Advantages of Dwarfs.

The flowers upon small plants very rarely suffer from what is called damping, because the pots, being small, do not hold much moisture; besides, they are tolerably dry at night, and particularly towards morning when the mischief is done by the sun shining out brightly upon

them and scalding the flowers in the larger pots, which are loaded with moisture from the evaporation of the larger body of soil. These plants will not want any stimulants until the pots are full of roots. Then treat them in the same way as the larger plants. Many of my readers will think these small pots would require too much attention in watering, but such is not the case. The large plants have to be gone over at least three, and in very hot weather four, times daily; but twice a day is sufficient for the smaller pots, because they do not get full of roots until August, and then the days begin to shorten and the nights to get more dewy. A very great advantage for these dwarfs is that you can grow three of them in the same space as one large one, and so increase, for your space, the number of varieties to be produced.

There can be but one conclusion in regard to the cultivation of dwarf chrysanthemums—namely, that if you do not try a few plants this way you ought to do so forthwith, and if you once try them you will never give them up.

CHAPTER V.

CHRYSANTHEMUMS FOR DECORATION.

There are many ways in which chrysanthemums may be grown for decoration, according to fancy, or the position the plants have to occupy. My opinion as to the best method of growing a pretty decorative plant is to insert the cuttings in March, as pointed out in the last chapter, and take out the points when they are established in small pots. Then from the pinching take three shoots. Let them grow six inches, pinch them once more, and allow three shoots to grow from each again. Each of these nine shoots should have a neat stick, and be allowed to carry one flower. These will be of good quality and colour, and will be sure to please. Or they may be left in sprays. These latter will not be nearly such fine blooms, but they are very useful for cutting or massing, and, by striking late, the foliage is retained down to the pot if the watering is carefully done. Some of these plants would require 7-in. pots, but some could be grown in 6-in. pots.

Large Specimens.

If large specimens are required they must be rooted as early in December as possible, or even in November, and potted on when ready. After they have grown six inches take out the point; keep them gently growing in every other respect like show varieties. When they have grown six inches stop them again, and give each shoot a small stiff stake, tying them out fairly wide and evenly, for this will form the foundation of the plant. Pot them on as they require it so that they may receive no check, and leave three shoots to each break from the pinching. When these shoots are six inches long pinch them again, and from the break leave three shoots to each as before. Continue the stopping until Midsummer, but not later, for so many

pinchings tend to weaken the growths, which must now have time to get strong. By the end of July, or early in August, they will make a natural break, when three or four shoots may be left from each break.

Training the Shoots.

Great care must be taken to prevent the shoots from snapping or splintering off, and the cultivator must decide as to how he will secure these shoots and in what shape he will train the plant. Some prefer staking them out evenly all round. If this is done monster plants result from some varieties, six to eight feet through. Some again train and tie them all one way for going back against walls, some to form large pin-cushions, some pyramids. In each case they look very pretty. For training, a hoop of rather stout wire must be fixed beyond the rim of the pot by securing four sticks to the top of the pot thus and the wire round them. For pyramids a stout stake must be placed in the centre of the pot the height required, and thin wire or string stretched from the top of the stake to the circular wire at regular intervals. A stiff wire hoop should be placed half-way down to support these wires, or the bending of the shoots will pull them out of shape. Then the shoots may be tied so as to distribute the points evenly all over. The last tying should be done soon after the buds are secured, and before the growth gets too stiff. If left too late, the flowers will not grow upright, and so look unnatural. When the plants are housed they should have a position where the light is equally diffused all round or they will draw in a one-sided way.

If the plants are to be trained to an oval or cushion shape they must have several stakes evenly distributed about the height required, and wire or string attached from the hoop to the sticks in several places, sufficient for all the shoots to be tied to. Tie them all over evenly as for the pyramids.

CHAPTER VI.

EARLY FLOWERING CHRYSANTHEMUMS.

Since the last edition of this work was published, early flowering chrysanthemums—plants which are suitable for

Coacher's Crimson.

(*Decorative.*)

Early Flowering Double Chrysanthemum.

out-door cultivation, and which bloom in the open air—have become firmly established as universal favourites. In the year 1904, the date to which I refer, the early

Eden; Early Pink.
(*Incurving.*)

Early Flowering Double Chrysanthemum.

varieties were only beginning to come into notice, but nowadays they are one of the most popular flowers for borders during the autumn months. The reason for this

is not far to seek when it is borne in mind how prolific these chrysanthemums are in producing blooms, their infinite variety of colours, and the long time the flowers last when cut. Another important fact is that they are ex-

Roi des Blancs; Early White.

(*Japanese.*)

Early Flowering Double Chrysanthemum.

tremely easy to cultivate, and they flourish in towns as well as in the heart of the country. They may be planted in the kitchen-garden to make their growth in the summer and afterwards dug up and potted, or planted in the bed or border just before they flower, or they may be

Glory of Merstham ; Early Pink.
(*Reflexed.*)
Early Flowering Double Chrysanthemum.

shifted even while they are in full bloom. Indeed, if they are given a good soaking the day before they are removed, and another soaking after they are re-planted, one would hardly know they had been shifted.

The early flowering chrysanthemums comprise several sections, including Pompoms, Japanese and Singles. The method of cultivation in all cases is the same. As the former varieties are now very generally known it is needless to refer to them at length, and I will therefore deal in this chapter particularly with the Singles, which can now be cultivated in the open air, not only in the gardens of the great, but also by the humblest cottager with only a few yards of ground to spare.

How Early Singles were Obtained.

As this book is not only a guide to the cultivation of chrysanthemums, but is also intended to possess historical value, I may, I hope, be permitted, without over-stepping the bounds of modesty, briefly to allude to the way in which the early Singles came to be introduced to the horticultural world.

When I removed from Earlswood to Merstham in 1904, there were only two or three single varieties of chrysanthemums which flowered in the open by the end of September. I had been so successful in raising a vast number of early Japanese varieties that I determined to obtain a similar result in the case of singles. The initial efforts were somewhat disappointing, but by dint of perseverance I obtained a batch of rather weedy-looking seedlings through crossing some of the October flowers with the September varieties mentioned above. Included in the seedlings was one which I subsequently named Surrey, which was the best of the lot. This I crossed with Mabel Goacher. The result surprised all anticipations, flowers of amazing numbers and of infinite variety of shape and colouring being produced. Thus within three years I was able to plant out 20,000 early flowering singles at the Merstham Nurseries, all these chrysanthemums being grown specially

New Early Single; grown and flowered seven months from sowing the seed.

for seed. It was this experiment on my part at hybridising which resulted in the introduction of early flowering singles, and it is safe to say that this new departure is

Spray of Early Flowering Single, Kate Carter.

destined to revolutionise the business of chrysanthemum growing. These light, graceful flowers, which are especially suitable for decorative purposes, have leaped into

Spray of Early Flowering Single, Firebrand.

public favour, and are certain to increase in popularity as time goes on. Early flowering singles may now be regarded as an annual as well as a perennial. Seeds were offered for sale by me for the first time in January, 1909, and many growers who sowed the seeds in February, and bedded the plants in the same way as asters, were able to cut sprays of chrysanthemums in July. From this time until the blooms are cut down by the frost a plentiful supply can always be depended on.

Propagation.

In dealing with the cultivation of all kinds of early flowering chrysanthemums, including singles, it is necessary to begin with the preparation of the ground they are to occupy. During the winter months trenching or deep digging should be carried out so that the soil may become pulverised by the frost. Plenty of manure should be applied. If the ground is very light or sandy, I should advise the use of cow manure, but otherwise stable manure is preferable. Although it is a fact that chrysanthemums will thrive almost anywhere, still, to obtain the best results, it is essential that due regard should be paid to these matters; and if, when digging, some vaporite or kill-grub is worked into the soil, considerable trouble will be avoided later on.

There are various methods of propagation. The best way is to lift one or two stools of each variety after they have flowered, and put them into a cool green-house or frame, keeping the stool fairly dry and well ventilated. When the cuttings are two or three inches high—in February, March, or April—they may be taken off and rooted in the ordinary way, *i.e.*, dibbled into boxes of sandy soil, fairly close together. Watering should be done with a fine rose, and the cuttings should be put into a rather close house, heated to about 45 degrees, but if the temperature runs up to 60 degrees on sunny days it will do no harm.

In about five or six weeks the cuttings will have rooted, when they should be moved into a cooler house, or frame,

and will need more air to harden them off. When hardened they may be planted about two or three inches apart in a cold frame, or in a sheltered place, where they can be pro-

A Box of Plants ready for planting in the open ground.

tected from frost or snow until the time arrives for planting out, although my own practice is, generally, to plant straight from the boxes into the open ground.

Another way by which propagation may be done is to leave the suckers on the old stools until they become rooted, and then plant them out about the middle or end of April, but as such plants invariably grow taller than those from cuttings, wherever possible the former method is to be preferred.

If the weather should become very dry after planting, it is advisable to give the chrysanthemums at least one good soaking. But it is surprising how soon they begin to make fibrous roots if the ground is in good condition.

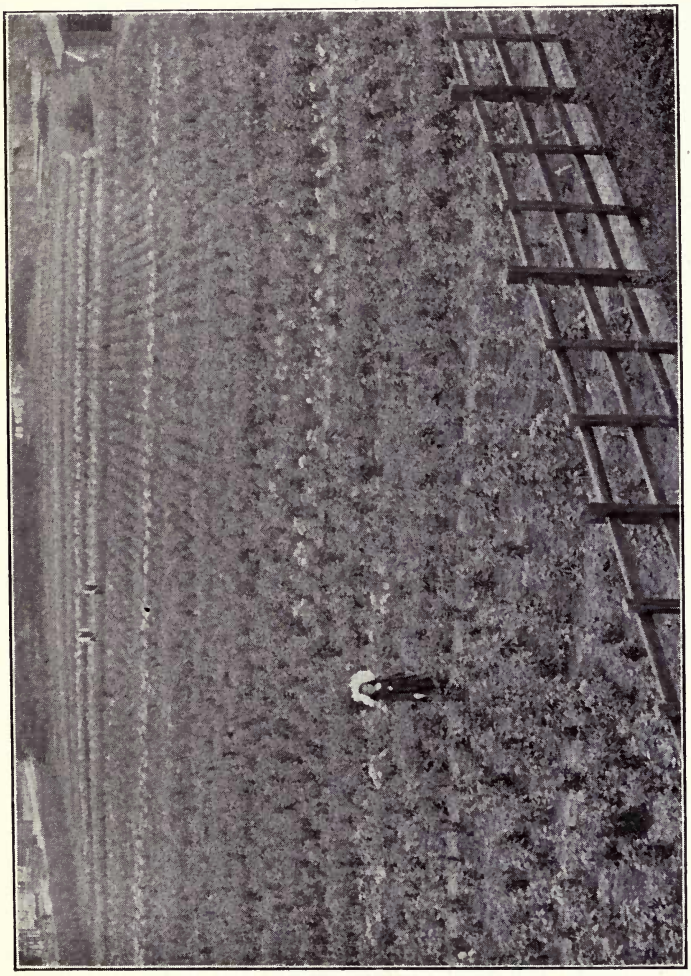
About the middle or end of June, or as soon as the plants become established, take the points out to make them bushy; in fact, they should all be "stopped" to within four or six inches of the ground.

Planting Out.

At the Merstham Nurseries, as we require to set out from 80,000 to 100,000 plants every year, we are obliged to work on a larger scale than that of the ordinary grower, but as our method can be employed with advantage in comparatively small gardens, the particulars may be of interest.

A few days before we begin planting out we prepare a galvanised wire line and run it out straight along a fence where it can be easily measured. We mark the fence at distances of 18 inches apart, put a spot of paint on the wire opposite each mark, and then tie some fine tar string at each paint spot, twisting it round the wire two or three times. Afterwards the string is painted over and left to dry for a few days. In this way a line is obtained which will not shrink with the wet nor stretch in the sun, and it is almost everlasting.

When preparing for planting, first put down a guide line, which should remain, and be kept quite taut. Then square the planting line with one knot about an inch over the guide line, and put out the plants with a trowel opposite each knot. Care should be taken not to touch the planting line with the trowel, for if it is pushed aside each



View of 2-Acre Field, showing how plants should be set out.

time the row will become bowed. For this reason never plant within an inch of the line, so as to keep it straight. Every fifth row should be left out, leaving beds of four rows, with a path where the fifth row would have been.

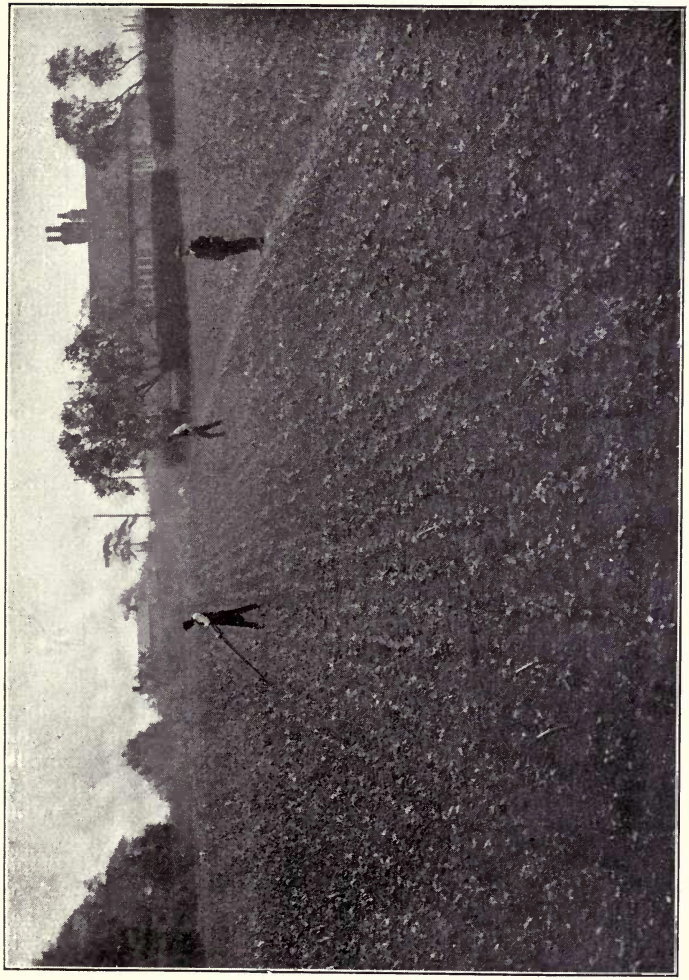
Hoeing and Staking.

When planting is carried out in this way the rows of chrysanthemums will appear straight from whatever point one looks. Another advantage is that the important business of hoeing can be easily and expeditiously performed.

I should recommend anyone who has more than ten rods of ground to buy a Planet hoe, which can be run up and down between the rows and also across the rows. This should be done immediately after planting has been finished, as it gives the ground a neat appearance and also loosens the soil and prevents it drying and cracking as quickly as would otherwise be the case. This system of hoeing is also to be recommended whenever weeding requires to be done. We rarely use hand hoes at Merstham, unless weeds get too close and plentiful, for the wheel hoes may be run within an inch of the plants until they get large. A good motto is "never let a weed get large enough to seed."

Staking should be commenced as soon as the shoots are large enough to tie, or a very heavy rain may break off some of them. It is a good plan to place the sticks about two inches from the plant, and always in the straight line of planting. When staking it is best to use sticks which will be a little below the flower heads when the plants are in bloom, or else the flowers may get dashed against them by the wind and be bruised.

It is essential that the shoots should be kept securely tied before the plants flower, for the rough winds and heavy rains of September try the sticks and ties; if the latter are at all weakly the plants get blown down and hopelessly injured, and thus a whole season's work will be wasted. This is one of the lessons which dilatory people learn after their first season.



Hoeing in Six Acres, showing how plants can be hoed up and down and across the lines.

CHAPTER VII.

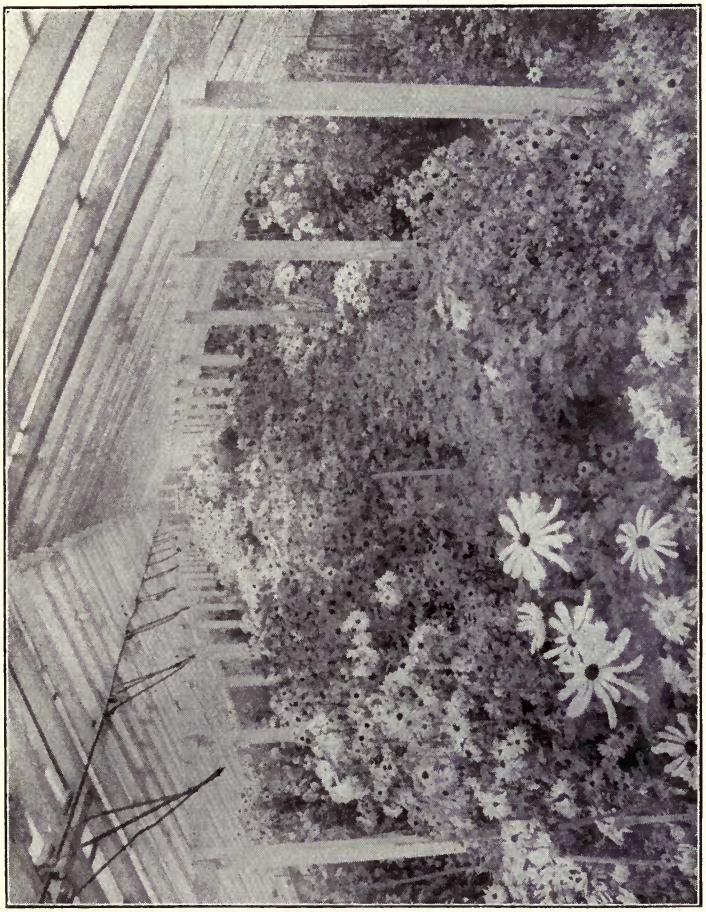
SINGLE CHRYSANTHEMUMS FOR POT CULTURE.

Within the last few years single chrysanthemums have become universally popular, and are admired everywhere. They are so graceful and light that for vases or table decoration they have few equals, especially during the autumn and dull winter months. I have raised and distributed a good many singles, although a few years ago I was told to throw them on the rubbish heap, as there was "not enough money in them." However, I felt certain that others would come to see them as I did, so I persevered, and now we sell as many singles as we do Japanese. It is a pity to disbud the small singles, although with some of the larger flowering kinds one good perfect flower is preferable to what would otherwise be a cluster of deformed blooms crowding each other out of shape.

When raising singles for distribution I generally select those with the flowers nicely separated on the spray (as shown in the illustrations of Kate Carter and Firebrand), rather than those which have all the flowers close together at the top, although the latter are generally the best for disbudding to one flower on a stem.

From July to February.

Some sorts of single chrysanthemums begin flowering in July; others follow on, and flowers can be had up to the end of February. When cut, certain varieties will shoot out below, give a number of small sprays, and keep flowering away for some time. These can be grown in many ways—as bush plants, or as trained specimens, in the same way that I have advised for others. I would recommend all who have a few spare feet of ground to plant singles for cut flowers out of doors; or they may be lifted and plunged in the greenhouse, or potted and brought in after the large flowering ones are over.



Our Single House in November—150 feet in length.

Singles need not be propagated early—say in March. Plant them out in any odd spaces which require filling up,

A Single Variety Stopped for the First Time.

but not under trees. They will stand a few degrees of frost. Each plant will require a stake. Pinch them occasionally if they are making long breaks, and loop

them to the stake to prevent the wind from blowing them about. This is nearly all that one need trouble about.

A Single Variety Stopped for the Second Time.

How to Grow Singles.

The best way to grow singles is to root them in March; pot them when rooted; pinch them when five or six inches

high; leave three shoots to grow about five or six inches; then pinch again, and leave three shoots to each as before. Let these grow, and you will get a plant in a 7-in. pot (which is quite large enough) with nine lovely sprays. If you want large flowers, disbud them to one on each shoot. But the small flowers look better in sprays. Some varieties are very dwarf, and only grow from eighteen inches to two feet. Miss Rose, Miss Mary Anderson, and many of the small sorts, are better left with as many shoots as they will carry, and they will be a mass of bloom. Singles should always be let go on to the terminal bud, for you then get the natural colour and pure single flower. If they are taken on the crown, or second crown, the colour is not good, and you sometimes get semi-double flowers.

Very dwarf plants can be had by rooting four cuttings in a 4-in. pot in July. Tops of growing plants are best. Leave them to grow and flower in these pots. Do not disbud them, and you will get pretty little plants less than a foot high.

After Flowering.

When your large Japs have finished flowering and you want a little more show, dig up some bushes of singles from the open ground and pot them. Water them in; sprinkle them overhead once or twice to prevent flagging, and you will soon have another display, which will be an entire change; indeed, I very much doubt if they will not be more appreciated even than the large flowering varieties. But it is quite probable that they will be affording you so many cut flowers in the open that you will not want to dig them up. However, if a sharp frost should occur, it would be as well to put a few sticks amongst them, and hang mats over them, although they will stand five or six degrees of frost and look none the worse for it in the morning.

I have more than once taken first prize at the old Aquarium at Westminster with singles which I cut from the open ground without any protection the second week in December.

A Large Gold Medal Group at the N.C.S. Exhibition, 3rd November, 1909.

CHAPTER VIII.

POMPOMS AND ANEMONES.

Pompom chrysanthemums should be grown in a similar way to the large flowering varieties, but they should not be rooted before January. Grow about eight or nine on a plant; an 8-in. pot will be quite large enough. The buds will not require to be secured until quite the end of August, or up to the middle of September, as terminal buds produce the best flowers. Crown buds come too coarse, and are devoid of that bright colour which terminals have.

When grown for specimen plants, pompoms require the same treatment as decorative or single varieties. For conservatory decoration they may be rooted later, say, the end of March or even up to the end of April, and nice plants may be grown in from five to six inch pots. The treatment is the same as for single varieties.

Anemone Chrysanthemums.

These are not grown to nearly the same extent that they were before the singles came so much into favour, and the showing of flowers on boards went out of fashion. Very few people would attempt to pack anemones in a case and expect them to come out perfect for a show, for if two or three guard petals are bruised or pulled out, the beauty of the flower has gone. Nevertheless, there are a few of the stiff-stemmed kinds which make very pretty pot plants, and are also effective in sprays. The treatment should be the same as for singles.

A few good ones for bush plants are Descartes, Mrs. C. J. Salter, La Marguerite, Mrs. Caterer, Mrs. Shimmins, and Fabian de Mediana.

CHAPTER IX.

THE HOUSING OF PLANTS.

Housing the plants should be completed by the end of September, as it is not wise to run any risk after having got so far. In low-lying districts the plants must be housed a little sooner than those on the hills, fogs and early frosts being more troublesome.

Every grower has to arrange his plants according to the accommodation at his disposal; therefore that must be a matter left pretty much to himself. But, having cleaned the house, next clean the plants by taking off all decayed or partly-decayed leaves, and tap the plants well with the hand to dislodge any caterpillars or earwigs, and syringe or spray them to check mildew, etc.

Begin the housing by taking the tallest plants in first, for a gale may come on and make sad havoc among them at any time, and, of course, the tallest suffer most. Any that have shown colour should first be put under cover; then the matter of arrangement afterwards is greatly simplified. It is no use advising every grower to have his blooms about a foot (or any particular distance) from the glass, because the flowers are grown for the enjoyment of the cultivators, and they must be so placed that they may be seen to the best advantage. The individual blooms should be tied out to prevent contact with each other when fully expanded, as such contact would greatly mar their symmetry. If the flowers have weak stems a slight stick should be tied close under the bud, and down the stem, so as to keep them erect, especially if they are for exhibition, for then the flowers open much more evenly. If, when housing, any varieties show signs of being a little too early, they must be placed in the coolest and most shady spot; or if not early enough, moved to the warmest one. Either of these arrangements may make a difference of a day or two one way or the other, but not more.

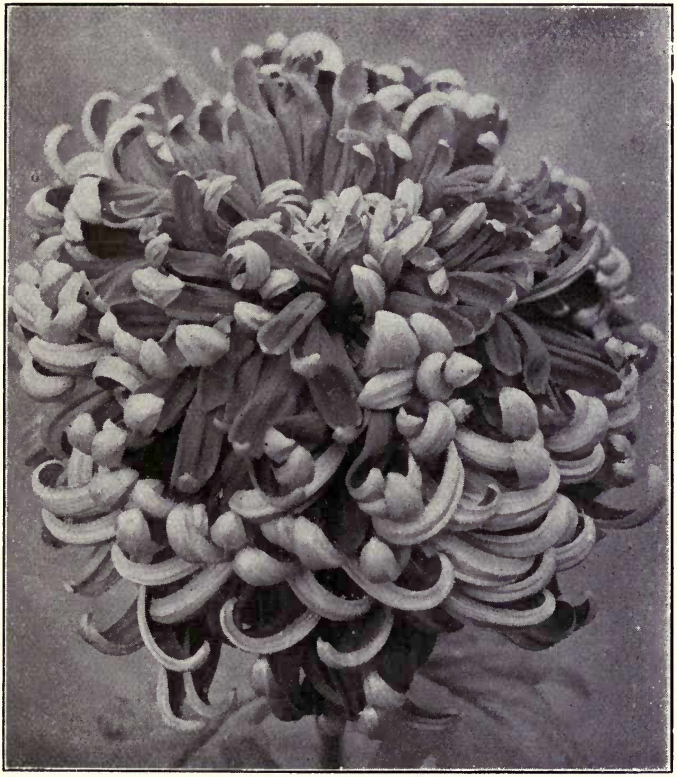
Fumigation and Ventilation.

After the house (or each house) is filled, and the foliage is perfectly dry, choose a still night, and shut the house

Alice Lemon.

up close, any time after the sun is off the glass, and give it a thoroughly good smoking with Auto-shreds. The

ventilators should be opened again as soon as all the fumes have cleared away, or from four to five hours afterwards.



Howard Could (syn. **Bessie C. Payne**).

After the plants are housed, the top ventilators should not be closed, except for smoking the plants or to keep out heavy fogs; but the side ventilators should be shut

at night or on foggy days, to prevent the damp air from drawing in at the bottom and going out at the top, resting on the blooms midway. This is what happens if the side ventilators are not closed. It is better to put on a little fire-heat, so that the plants may have a small amount of warmth and plenty of air at the top. A slight shading when the flowers are opening is beneficial, especially to the dark coloured varieties. There should be no danger of damping, or scalding—that is, if the watering is done carefully and before mid-day.

Watering and Manuring.

The watering should be done by mid-day, and certainly not after three o'clock, so that everything may be dry before dark. The plants want very little water for a few days after they are housed. In fact, it makes one feel as if something were going wrong with them, so persistently damp do they keep, especially those in large pots; but patience will bring everything right. Some cultivators say, "Do not use any stimulant for a few days after the plants are taken indoors." This is quite right, since the stimulant is given in water, and, as I have said, they require scarcely any water. From the time they are housed I use nothing but a little pure Peruvian guano—not more than a teaspoonful to two gallons of water. This I use at each watering. It is of a more drying nature than anything else I know. Any kind of manure containing salt, or which will create moisture, should be carefully used after housing; and I would advise those who have not a thorough knowledge of the constituents of manures to use guano. This may be applied until the flowers are half expanded.

Show Blooms.

If any blooms are required for show, and are likely to be a week too soon, cut them two days before they are fully out. They will come up if they are put in water, and placed in a dry, semi-dark, cool place. They should be

cut with long stems. Strip off all the leaves, put the stems into glass bottles, nearly full of water, and use wadding to prevent evaporation from the bottles. It is much easier to keep a flower a week than it is to push it to gain a day. Chrysanthemums do not like being forced.

A flower is at its best when it has all the centre florets well up and none of the lower florets have began to decay. To obtain this result should be the aim of each exhibitor, and if the flowers are in other respects well grown there will not be much to fear. But with Japs it is better if necessity arise to pull out a few short undeveloped florets from the centre, provided that there are plenty left to shake into their places, rather than lose the long, drooping, lower petals from decay. With incurveds it is different. If their centres are not pretty well up, the half-grown petals have to be removed and the core gouged out, also, in order to get the long florets to meet in the centre with a view to the manufacture of a good bloom out of half of one. But flowers so manipulated never gain high honours. Unless an exhibitor is hard pressed for a bloom to make up his number, such immature specimens are better left on the plants, either for a future show or for decorative purposes.

CHAPTER X.

STAGING FLOWERS FOR EXHIBITION.

The staging of flowers for exhibition has now become a fine art, and there seems a great diversity of views on the matter. My humble opinion is that everything should be made as easy as possible for competitors; for whatever arrangements may be decided upon by committees to make a show look artistic and attractive to the public, the exhibitor should have the first consideration. As a rule, the latter, when he is a member of a show committee, remains silent when questions affecting exhibitors are discussed for fear of being regarded as an interested party, and he remains inactive when the time arrives to send in his entries if the conditions have been made too hard. This explains why growers often fail to support the local chrysanthemum show. As previously mentioned, I would rather see 12 or more entries in classes for 24 distinct varieties, than the same number of entries for eight trebles, whether on boards or in vases. The same may be said respecting amateur classes for six or twelve varieties. Indeed, it would be easier for amateurs to show a certain number of distinct varieties than the same number of flowers in trebles, and there would be three times the number of varieties for the public to inspect, including probably a few "novelties." When invited to compete for trebles an exhibitor cannot afford to speculate in novelties.

The Method of Staging.

In staging flowers for exhibition there are three things in particular to be considered. They are as follows:—

Firstly, clean, bright, deep-green boards, enamelled some days previous to the show.

Secondly, the colours of the flowers must be nicely blended, so as not to get two of one colour together. Try

to arrange the colours so that each bloom will brighten and show up its neighbour. It may be useful to remember that colour is greatly heightened by contrast, and that artists in their pictures secure the greatest brilliancy of colour by the observance of this rule. The contrasting colours are red and green, orange and blue, yellow and purple. Place a yellow and a purple chrysanthemum side by side. The longer you look at them the more yellow will the yellow appear, the more purple the purple.

Thirdly, see that the board is pretty evenly filled, so as not to get two small flowers together, or two large ones. Different exhibitors have different opinions about staging their flowers. Some put all drooping flowers in the front row, all the monsters at the back, and the weakest flowers in the middle row, thinking, perhaps, they will not be noticed so much if they are hidden a little. But do not try to deceive the judge. He is bound to find the worst as well as the best flowers.

Cutting Blooms and Cupping.

Flowers are better if cut in the morning, before the sun strikes them. Stems about a foot or more in length should be left to them. *Strip off all the leaves* and put the stems into bottles of water, or something that will keep them upright. They may then be cupped up at your leisure during the day. This should be done in a rather cool, but dry, place.

Before you commence cutting the blooms, it is as well to look round and see what blooms are ready. Dot out your board on a piece of paper, with the number of flowers you want, *e.g.*, twelve dots to represent the holes. At each hole put the name of the flower with which you intend to fill it. This will save you cutting more blooms than are actually required; but at the same time an extra bloom should always be taken with each dozen, in case of an accident, and this should be different from any on the board. In cupping the flowers do not press the florets up to try to gain width for them, because from a show

point what you gain in width you lose in depth, and depth is more valuable than breadth; for the most graceful bloom is that possessing handsome drooping florets.

The size of any cup or wire must not exceed three inches. If the flowers have grown upright and evenly they will not require anything but the cups under them; but if they have grown one-sided, a small splint must be run up close under the flower, and tied tightly to the stem. For plugging the flowers in the cups I cut pieces of the stem into wedges about two inches long. When each flower is cupped, it should be put into the water-tube, and placed in its position on the board, and so on with the others. When all are so far ready, a little re-arrangement may be necessary to make each bloom appear at its best; for if you have really good specimens it is a pity to lose a point by bad arrangement. On the other hand, if your blooms are not really first-class, you may win a point by setting them out to the best advantage. And at any rate, if you do not obtain premier honours you will gain satisfaction and possibly some benefit by taking a good survey of all the First Prize exhibits, and go home with a determination to do better another year.

Entering at Shows.

If it is your first attempt at showing, do not enter in a larger class than you are able to manage. It may be an easy matter to get twelve good blooms when it would be difficult to get twenty-four. Young exhibitors should not be disappointed if they do not happen to gain all First Prizes at the outset. Old hands are pretty well contented if they can manage to figure in the first three in a strongly contested class.

Many novelties are introduced each year. Some are really grand, and add materially to an exhibit; but exhibitors must not run away with the idea that merely because they have new varieties they are of necessity going to gain extra points, unless the specimens are superior to older varieties. A badly grown novelty will not compare with an older variety well grown.

Chrysanthemums in Vases.

The exhibition of large Japanese and Incurved chrysanthemums in vases has become very popular with many societies for staging their flowers. It may be an improvement when the blooms are properly arranged—with vessels proportionate in size to the flowers, and plenty of foliage drooping quite down to or below the top of the vase. But taste and judgment are necessary. To see three or more large flowers stuck into a small vase, and, perhaps, stood upon lattice-work stages, or, maybe, the flowers so crushed together that they do not show to advantage, is not the way to display the blooms; on the contrary, the use of boards would be a better way of exhibiting them.

In arranging chrysanthemums in large vases one must bear in mind that if it should be a show of more than one day's duration the flower stems will not supply sufficient sap to keep the bloom and foliage from flagging, especially in a warm dry atmosphere; therefore it is (or should be) admissible to strip the foliage from the stem which bears the flower, and tie another stem with foliage to the flower stem. By this means one stem will supply the flower and the other the foliage with sufficient water or sap to keep each fresh for two or even three days.

Some Remarks on Grouping.

A few words on grouping may not be out of place, although I cannot point to any marked general improvement since my last book appeared. The group illustrated on page 59 was one which took the large gold medal at the Crystal Palace in November, 1909. It will be noticed that there are no straight lines anywhere in the group, but that the blooms are arranged so that, while each one is clearly displayed, the whole effect is artistic and effective.

CHAPTER XI.

HOW TO PACK CHRYSANTHEMUMS.

Packing large flowers on long stems for travelling is undoubtedly a question which puzzles many exhibitors. In

Exhibition Flower Ready for Packing for Show.

America and France all chrysanthemums are shown with long stems, and I have seen some novel methods of packing the flowers. I have taken flowers long distances, and I

have packed them to travel to the Continent, and even as far as America! The last-mentioned were despatched from our nurseries on a Friday, and left Liverpool on the Saturday; and the following Saturday afternoon they were exhibited in a great show in New York. I was assured that when displayed they looked as fresh as if they had been packed only the day before. On another occasion some of my flowers were exhibited after being packed eleven days.

The best method of packing flowers which are intended to travel a long distance may be briefly described as follows :—

When the flowers are quite dry, viz., when there is no dampness upon them, take each one and hold it bloom downwards. If you are obliged to pack unassisted, hold the stem between your teeth. Then take a sheet of tissue paper, tear it nearly in half, and put the paper over the flower. In doing this draw all the petals together just close enough that they will not move. Then twist the paper lightly over the top of the bloom, and lay the flower gently in the box so that it cannot move. I may say that when the papering operation is finished, and before laying it in the box, I always sharpen the stem slightly, taking off all knots, and slip it into one of my patent water tubes. This supplies sufficient water to keep the flowers fresh for a long journey.

CHAPTER XII.

CHRYSANTHEMUMS FOR MARKET.

The growing of chrysanthemums for market is a question of £ s. d. more than anything else, and is a very serious matter for beginners who know little or nothing of the trade. Chrysanthemums are produced by the acre by some growers, being planted out in the open, whilst others raise them by thousands in pots, and try all manner of schemes to get the produce a week, or even a few days, earlier or later than their neighbours. Such growers are keen men of business, and are always on the look-out for any really good, bright-coloured varieties, and are prepared to pay a long price for them, too. Furthermore, the classes of customers for whom they grow them differ considerably, and the various markets differ as much.

There is no doubt but that many of the best markets can take an enormous quantity of *first-class* flowers, and these are generally fairly remunerative. By first-class I mean good, *bright*, *distinct colours*, disbudded to specimen blooms and nicely packed, so that they look as fresh when taken out of the boxes as when they were despatched. Many people grow their flowers well and spoil them in packing.

Generally speaking, the "rough and tumble" produce is left on the market until the last, being eventually sold to costers at a clear-out figure, thus bringing a very low price to the grower.

Good Colouring.

Do not grow a lot of washy, dirty colours, which are neither whites, pinks, reds, nor any other shade; but grow the best whites, pure pinks, reds, crimsons, gold, bronze, or yellows. These distinct colours are sure to suit some of your customers. Do not grow varieties that want a stick to each flower to keep it upright.

Again, if you want your flowers to pay they must be good too. Medium class stuff is always plentiful and

cheap, and an over-supply is generally on hand. But if a florist has something really choice on show, good in colour and a fair size, he can command a good price for it, sufficient to allow of a profit for himself and the grower as well. And the latter soon gets applications for a fresh and regular supply, and so a profitable agreement is come to between them. For the best florists do not depend entirely upon the markets, but prefer to procure their flowers direct from the growers, thereby receiving them in the freshest possible condition.

How to Grow Market Varieties.

We must commence with early flowering varieties. When these have done flowering a sufficient quantity of the old stock should be dug up. Cut the old stems to within six inches of the ground; clean away decayed leaves, or anything which may cause decay. Put these pretty closely together in frames, or the end of a cold house, or any place where they can be kept above freezing-point. In February take the cuttings which have grown clean away. Do not grub them out of the soil. A cutting two inches long is ample. Dibble these (not too thickly) into boxes of fine soil and a little sand. Place them in a gentle heat, and sprinkle them to keep them from flagging. They will speedily make root. As soon as they are rooted, and before they begin to run, stand them out into cold frames. Keep these closed for a few days. Then begin to allow air, and when they show signs of growing take out their points. Give them air on all favourable occasions in abundance. They will stand in these boxes until April or May, and become nice little sturdy plants.

Towards the end of April the ground where these are intended to be planted should be got ready for the operation. Many growers draw out drills as if for planting peas (about 18 inches apart), and place the plants in these. They are thus sheltered somewhat from the wind.

By the beginning of May planting may commence in earnest where large batches have to be put in, and they should be planted 15 or 18 inches apart in the rows. It is

better to plant them in beds of four or six rows, leaving three-feet pathways between the beds.

Plants in Pots.

For plants which are intended to be grown in pots, soil should be used similar to that which is recommended for other work (*see* Chap. XIII., "Soil for Potting"). But that which has grown cucumbers the previous season has of necessity to be substituted by florists. When this is ready you may get a box of plants. Tap each side on the bench to loosen the roots from the sides all round. Toss the plants clean out of the box on to your soil on the bench. Each plant can then be taken off with quite a nice ball, and the roots will draw out without injury. Pot them fairly firmly (I need not go through all the crocking process, florists know how to do that); 6-in. pots should be used for the best, and 5-in. for the next best plants. The worst should be thrown away. When potted, stand them close together in a cold frame; or they may be protected out of doors if frames are scarce. Give them a good watering with the rose on the can. Shade them a little for a few days if the sun is very bright. Cold, cutting winds are their worst enemies; they give them a check, and these checks are favourable to insects. Whether the plants are in or out of frames they should not be shaded sufficiently to draw them, but they should be brought up as hardily as possible. They will stand six or eight degrees of frost, especially if they are somewhat dry. Do not water in the afternoons if it can be avoided.

Take the points out of the plants when they are about six inches high. By the middle of May the plants should be stood out in beds, six rows wide, allowing two or three inches from pot to pot each way. If they can be stood on ashes or boards, so much the better; but if not, clear lime water should be used occasionally to keep out worms. Do not leave more than three shoots to each plant. A stake two feet long should be put to each, and these shoots should be tied to it. In case a sharp frost occurs these stakes will

come in useful for hanging tiffany over, or mats, or anything which will break the frost.

About the middle of June pot into the flowering-pots. Nine-inch pots will be quite large enough for the best;

Vase of Decorative Varieties.

Names (reading from left to right) :—
Back row—MRS. W. A. READ, NEAPOLITAN, HILDA KATHLEEN.
Middle row—MRS. D. SYME, MRS. BUCKBEE, MISS A. FINCH.
Bottom row—KARA DOW.

eight inches for the others. If the soil can be made as good as that recommended for the large flowering (or show) varieties, I would advise it; but the turfy loam has generally by florists to be displaced by a substitute from the old soil heap. If this has been turned over and got pretty well frosted it answers the purpose. By the soil heap I mean the old cucumber soil or anything which has been turned out of pots and thrown into a heap and has lain for a time. Such soil can easily be enriched by a little rotten manure, a few ground bones, and a good sprinkling of lime and soot. This should be prepared not later than February or March, and it will be ready when the busy time comes. For twenty to fifty cartloads of stuff cannot be prepared so easily in May or June as it can in winter, and it does not do to leave things till the last minute. In fact, it is much better to get the compost mixed a few months too soon than leave it until too late.

Placed in Rows.

The pots should have good drainage, and the plants be potted pretty firmly, or they will develop sappy growth at once. This never gives good flowers. When potted, they may be stood in beds four rows wide, but they must be six inches from pot to pot each way. If room can be spared I would advise only two rows. Each row must be wired and staked, and if the pots can be stood on ashes or boards so much the better, otherwise the roots get into the soil below and they receive a check when they are torn away. After the plants have made the next break, three or four shoots may be left to each; later, or the last break, three again. Then you get from two to three dozen flowers on a plant; but if you want them extra large do not leave so many. The last growths must be disbudded to one flower on a shoot. Of course, watering must be attended to; but I would advise that all plants be kept rather on the dry side than be over-watered. I would not recommend feeding before the last growth begins; but then you may feed liberally, for it will add wonderfully to the colour as well as the size of the blooms. Florists very rarely have any

trouble with flowers damping because they generally leave them to the terminal bud. In this way they get good colours. Bad colours would not sell.

If pot plants are wanted they may be rooted later and pinched about twice. They may be grown in 6-in. pots, or even 5-in.; but dwarf and free-flowering varieties must be selected.

Anything that the plants require must be done, and that in the cheapest possible way. Every row must be wired, and each plant have a good stake about the height it will grow to, and this must be tied to the wire. It will save time in the autumn and prevent the plants from getting blown about. All the growths can be looped to one stake, but not bundled together. It is better not to grow more plants than can be attended to thoroughly. After the buds are secured the plants may be rather liberally supplied with liquid manure water; anything will do, only change the nature of it occasionally.

Why Good Plants Pay Best.

Now for comparison. It would take a large plant from which to pick, say, three market-bunches raised in their natural grow-as-they-like style. In mid-season such flowers would be a drug in the market at threepence a large bunch, and in all likelihood would not fetch twopence, and perhaps not sell at all. Then you blame your salesman. He cannot help it. But send the same flowers grown as I advise above to the same salesman, and he will sell them at more per flower than he would get per bunch for the others and have no trouble in disposing of them.

These plants would want but very little more attention than those which are grown haphazard. The disbudding during their growth entails some extra labour, which would not, however, cost above one penny a plant more than if they were roughly cultivated. Against this your plants do not grow so tall, and they are over and done with sooner; besides, you get much more credit for your labour and a fairer living profit.

I certainly should not advise any grower to keep many varieties. But of course this is a matter which rests a good deal with his customers. They must be studied most. But by all means try a few of the best coloured newer varieties.

There is a good selection of early flowering varieties which begin to bloom quite by the beginning of September. A list of these is printed at the end of this book.

Mrs. R. Luxford.

CHAPTER XIII.

SOIL FOR POTTING.

With regard to soil for potting this is really the most particular in the whole process of growing chrysanthemums, for it is the foundation. I know in many places potting material must be very expensive; in fact, I find it so myself. Carting soil eight or ten miles is enough to run up the bill; but even if it spells extra expense it is the cheapest in the end to get the best.

The soil should be good, heavy, yellow loam, with plenty of fibre in it—that cut from a fine old pasture about three inches thick. Cut it during the winter. Do not select land where daisies grow, for they are seldom found on good ground. In stacking the soil choose an elevated position where the water is not likely to lie and sodden it. Flatten it down, and sprinkle a quarter of an inch of soot over this foundation to keep worms away. Then place a layer of the sods, grass side downwards; over that about an inch of nearly fresh horse-droppings; over that just enough soot to blacken it, and upon all a sprinkling of ground bones. Begin again with the loam, and so on until the stack is complete. It is best to draw in slightly all the way up, or make *a haystack-like top*, so as to keep the wet from penetrating too much.

The proportions should be one load of loam, a quarter of a load of short manure, one bushel of soot, and half-a-hundredweight of ground bones, none coarser than shot or very tiny peas. These are all the materials that need be stacked at this time, unless there are wire-worms in the soil; then a sprinkle of vaporite may be added about every foot. In stacking it is easy to measure the ground out accurately, for a load or yard of loam is three feet square—twenty-seven cubic feet. Begin then as already suggested, a little wider at the base than you intend to finish at the top, and if the ridge shape is maintained at the top no

covering will be required. Fermentation will proceed gradually.

Soil for Final Potting.

About a fortnight or so before you commence potting, chop the whole of the stack of loam to pieces in the following manner: Take cants of about a foot wide and cut them through straight down with a spade. Chop the sods to pieces with a very sharp hoe, by laying them grass-side upwards. I have found this to be the easiest and quickest way. Do not chop the turf smaller than cricket balls, for it will get reduced in turning. When it is all chopped, level it out a foot thick. It is then easy to measure what quantity you have—when it is remembered that twenty-seven square feet make one cubic yard. To each yard add four bushels of leaves collected the previous autumn; a barrow-load of old mortar rubbish (no pieces larger than nuts), or coarse sand; a barrow-load or two of ashes or fine charcoal; and twenty-eight pounds of artificial manure. Thoroughly mix the whole of this together by turning it over twice at least. Put this into a shed in a nice mound, or cover it outdoors to keep off the wet, or, on the other hand, prevent it from getting too dry; and the whole mass will become impregnated with the ammonia, etc., which the different ingredients contain.

Advice to Amateurs.

For amateurs who do not require such large quantities I would recommend one bushel of loam. To this add about two gallons of rotten manure, two gallons of oak or beech leaves, two gallons of old mortar rubbish or charcoal, two gallons of wood ashes, half a gallon of ground bones, and two pounds of artificial manure, made either from blood, bones, fish, or fowl manure. If the loam has not sufficient fibre a few more leaves may be added, also a dash of coarse sand, making about two bushels altogether. This quantity will be sufficient to pot fifteen or sixteen plants into 9-in. pots (16's). Various makers' pots differ a little in size.

CHAPTER XIV.

CHRYSANTHEMUMS ON THE CONTINENT.

Up to the present there are not many chrysanthemums grown abroad on the three-large-flowers-on-a-plant principle. The bush system is mostly in vogue. But before I say much about the foreign methods I must offer my readers a little explanation. In the first place, I felt that to visit some of the best growers abroad with whom I transact business would enlighten me as to what they considered the essential points of a good chrysanthemum—points worthy in their estimation of a certificate—because we annually import an enormous quantity which are not up to our standard. Tastes and climate differ, as we all know, and what may be considered good across the Channel may not be suitable to our climate; or again, a bloom which is prized as a lovely colour there may not be just the fancy here.

It goes without saying, I think, that our greatest liking is for large, graceful flowers, whilst Continental growers make bush plants their chief aim. As all experienced fanciers must know, the large show varieties are not always adapted for bush plants. Hence some disappointments. But there are other marked differences besides the system of cultivation adopted. Our Continental friends do not exhibit their flowers on boards; such blooms as are exhibited in a cut state are shown in bottles, with a foot or so of stem *and foliage*. A single stem is inserted in a bottle, and the bottles are then plunged into beds of sand or light earth. These beds are all turfed round, and each exhibitor's collection forms a flower garden. It must entail an enormous lot of work and forethought to arrange such exhibitions.

'Mums at the Paris Exhibition.

The chrysanthemum show at the great exhibition held in Paris in 1900 was very fine, and what struck visitors

most in connection with it was the resemblance the collections of exhibits bore to a tastefully laid out garden. But that is the custom on the other side of the Channel at nearly all chrysanthemum shows. I do not think, however, that I ever saw anything finer than the arrangement at the Paris show referred to. The French exhibit their plants and blooms in a way that gives the visitor the impression that they have grown in the beds, cartloads of sand and mould being shot down within the limits of the building where the show is being held, and in this improvised garden the competitors arrange their specimens. The names of the chrysanthemums are written on labels attached to the stems, and it is therefore difficult when walking through an exhibition to ascertain the names of each flower or plant. In this respect the English practice of exhibiting 'mums on tables and showing the names plainly is to be preferred.

CHAPTER XV.

CHRYSANTHEMUMS IN AMERICA.

In the last edition of this work I referred to the great popularity of chrysanthemums in the United States. The Queen of Autumn is regarded there as supreme during the fall of the year, just as it is in England and other European countries. Many flowers which hold pride of place during the summer months having faded at the coming of the cold weather, the chrysanthemum leaps into the front rank as first favourite. As the years go by it is found that the enthusiasm of the Americans for chrysanthemums steadily grows, and the most vivid personal impression which I obtained during a recent visit to the United States convinces me that there are untold possibilities for the development of chrysanthemum growing in the great land across the Western Ocean.

As America will become before long a formidable rival to Great Britain in the culutre of the chrysanthemum—even if it may not be so regarded at the present time—I may perhaps be permitted to introduce some observations here with regard to chrysanthemum cultivation in the United States, being the result of my own observations on a visit to that country.

I sailed for New York on board the "Mauretania," on October 23rd, 1909. In the first place, my object was to redeem a longstanding promise to visit some friends, and in the second place to see for myself what was going forward across the Atlantic as regards the introduction of new varieties of chrysanthemums, as well as the methods of culture and of exhibiting blooms which are generally followed there. From my friends, Mr. W. Duckham, who is gardener to Mrs. D. Willis James, of Madison, New Jersey, and Mr. C. H. Totty, also of Madison, I received a most hearty welcome, and if I did not see all that there was to be seen of the social side of life, and also as regard things horticultural, it was

certainly no fault of theirs. Others whom I met, and whose names are household words in gardening circles in America, were Dr. Ward and Mr. R. D. Foote, of Madison, and Mr. E. G. Hill, whom I met after an 800 miles journey from New York to his place at Richmond, Indiana. Genial, hearty, hospitable men they all are, devoted to their work as horticultural enthusiasts, and occupying quite the foremost place as popularisers of the Queen of Autumn. I also visited the palatial gardens of Mr. Howard Gould, of Castle Gould, Long Island, where the gardener, Mr. H. Turner, raises most beautiful chrysanthemums as well as an infinite number of other plants and flowers. I noticed in these gardens that all the chrysanthemum novelties in cultivation were those that had been distributed by W. Wells, and I asked Mr. Turner why there were no others. Modesty, however, prevents me recording his reply in full, but I may say that he has tried the varieties distributed by many others, and his experience has taught him that those raised by Pockett and sent out from Merstham are in all respects the most trustworthy.

The Most Popular Varieties.

Mr. Hill, to whom I have referred, is well known on this side of the Atlantic as the raiser of the Richmond and the Rhea Read roses (his rose stock comprises upwards of a million plants), but he is also a big grower of chrysanthemums for exhibition and for commercial purposes. Among the latter varieties may be enumerated Merza, Chadwick, Eaton, Enguehard, Balfour, Monrovia, Golden Eagle, and Winter Cheer. The last-named, which is quite incurving, is not large enough for American requirements. I also saw in these nurseries one of the new Merstham varieties, named after Mr. Hill's granddaughter, Alice Lemon, and Miss Hill assured me that the blooms were quite 12 inches across. The flowers, unfortunately, were over before my arrival. Mr. Hill's place at Richmond is about 100 miles from Chicago, and English readers will be interested to know that cut chrysanthe-

mums which were being marketed in that city were making in the wholesale markets about the middle of November, from 3 to 5 dollars (12s. to 21s.) per dozen. But even these prices, which are enough to make a British florist's mouth water, were surpassed by what I saw in New York, where good specimens were being readily disposed of in the Stores at from 2s. to 3s. a-piece. These varieties included Miriam Hankey, Merza, Appleton, and others of exhibition grade, with stems from four to five feet in length. In the establishment of Mr. C. H. Totty I noticed other varieties, including Rose Pockett, Keith Luxford, W. Mease, Mrs. H. Stevens, W. Hotston, Pockett's Surprise, Pockett's Crimson, R. F. Felton, Mrs. D. Syme, Howard Gould, and a great number of singles and pompoms, which were, in all respects, much better than any I have seen in England.

Forty-Four Inches Round.

The Americans attach the utmost importance to the size of blooms. One which has been raised by Mr. Duckham, and which he has called Onunda, measures, when well grown, 44 inches in circumference! Many other splendid varieties might be enumerated, but the list would be too extensive. The following, however, are entitled to special mention, in addition to those already specified:—Keith Luxford, W. Hotston, Merza, Miss M. Hankey, Beatrice May, Nellie Pockett, Cheltoni, Ben Wells, Chrysanthemum Montigny, C. H. Totty, Frank Payne, F. S. Vallis, Geo. Mileham, 1908, G. W. Pook, Lady Hopetoun, Leslie Morrison, Lilian Coppard, Mary Inglis, Mary Mason, Merstham Blush, Mr. T. Carrington, Mrs. E. Thirkell, Mrs. H. Barnes, Mrs. H. Partridge, Mrs. John E. Dunne, Mrs. Norman Davis, Mrs. O. H. Kahn, President Viger, Rose Pockett, W. Duckham, Mrs. W. Duckham, J. A. Miller, General Hutton, Mrs. J. C. Neill, Glenview, Marquis V. Venosta, Australie, Brighthurst, W. M. Moir, Louisseau Rosseau, Petite Renee, Yellow Miller, Hales Seedling, Mrs. C. H. Totty, Mary Donnellan, Mrs. Geo. Hunt, Goldmine, Mrs. L. Thorn, Mrs. W. Knox, Splen-

Mrs. David Syme; Crown and Photographed in America.

Onunda; the Largest Chrysanthemum in the World, measuring 44 inches round. Grown and Photographed in America.

dour, Clara Wells, Chas. Beckett, Donald McLeod, Morton F. Plant, O. H. Broomhead, Col. D. Appleton, W. Wells, W. R. Church, Mrs. S. Shaw (the Bronze Thirkell).

The foregoing were really magnificent. It is curious to notice that Purity, The Hon. Mrs. Lopes, Splendour, Master David, Master James, Sir Frank Crisp, and a few other varieties which do well in Great Britain all showed an eye, or had such weak stems that they were barred as general favourites. The Australian varieties, raised by Pockett and distributed by Wells, comprise 70 per cent. of the total number of blooms exhibited at the leading shows. The remaining 30 per cent. are nearly equally American, French and English raised varieties.

Cultural Methods.

As regards American cultural methods, the plan generally adopted is to put good clean sand in a bench, raised a couple of feet above the floor of the propagating house. The sand and soil are packed to a depth of about three inches, and this is kept at a temperature of from 55 to 65 degrees. Steam pipes are run beneath the bench in order to raise the temperature there to about 60 degrees. The cuttings, which are inserted in rows in the sand about one inch apart each way, root very quickly. Great care is taken to shade them from the direct rays of the sun, and watering is performed as often as is necessary to keep them from wilting. As soon as the cuttings have formed roots about an inch long, they are placed in thumb pots (2 to 2½ in.), and when they have become established they are transferred into 5-in. pots. In May or June the plants are shifted into stout boxes, each of which is capable of accommodating about 12, or else placed in benches raised about six inches above the floor, to admit in either case of free drainage. The plants for exhibition are placed in the beds or boxes at a distance of ten inches or a foot each way. Syringing and spraying are constantly carried out, and every effort is made to maintain the temperature at a comparatively low level in the hot summer. The hose is an indispensable implement in American nurseries and gardens, and

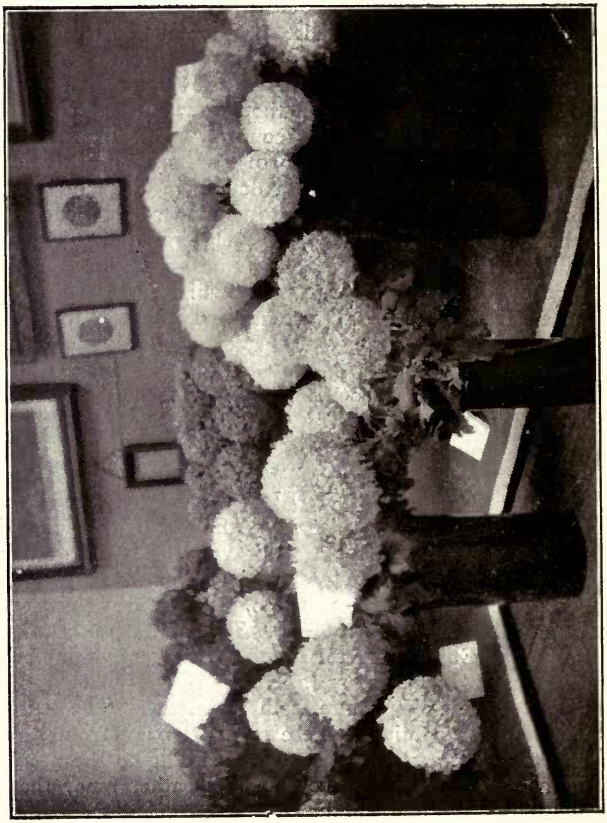
hydrants are used so as to economise labour as much as possible.

The fundamental difference between the cultivation of exhibition plants in America and in England lies briefly in this: In America, plants make three breaks to two breaks made by the same varieties in England. Propagation does not begin until February, and as the plants are grown indoors through the season, the growth is much more rapid than is the case in this country. This has also the effect of reducing the number of florets, and, therefore, flowers that do not come extra double in England would probably show an eye when grown under American conditions. I saw very clearly myself, varieties like The Hon. Mrs. Lopes, Purity, Master James, and Master David all had eyes as large as a shilling, while W. Mease, Mrs. H. Stevens, and others which had been sent over at the same time, were in every way splendid specimens as regards size and colour.

It should also be mentioned that in America no stopping or timing is practised, the first buds being secured after about August 10th.

At the Shows.

Chrysanthemums are generally exhibited at the shows in classes of 18, 20, and 25 distinct varieties. In all cases blooms are placed in vases, whether the exhibit consists of only one flower or as many as 50, and the vases are from seven to eighteen inches high. The feature that seems quite new to English ideas is the plan frequently adopted of having classes comprising 12, 25, and even 50 blooms of one sort. The stems range from 18 in. to 4 ft. in length, and the vases containing these specimens are from a few inches to a foot across at the top, according to the number of individual flowers each contains. I rather fancy that it would be quite out of the question to expect English growers to stage 25 or 50 chrysanthemums of one variety as a separate class at a show in this country; but our American cousins, as all the world knows, are in the habit of doing most things on a large scale!



Mary Donnellan. Miss M. Hankey. Merza.

No artificial support whatever is allowed to blooms staged for exhibition, and hence, in the case of the monster flowers which are so much admired, the heads are apt to droop. Visitors are frequently obliged to raise the flowers to examine them, and when this has been done many times the poor heads droop lower than ever. The prohibition of all artificial support has, however, one marked result; it compels growers to use every endeavour to produce varieties with strong stiff stems.

It is quite the usual practice to cut flowers intended for exhibition a week or more before the date of the show. They are kept in a darkened cellar, in barrels of water. Naturally, while there, they absorb a tremendous quantity of moisture, and, in consequence, the flowers remain quite fresh for several days while a show lasts. Chrysanthemums raised for commercial purposes are cut twenty-four hours before being despatched to market, and are kept in a cool, dark place in water, the idea being the same as in the case of the exhibition specimens—to make the blooms retain their freshness for a good while.

CHAPTER XVI.

CHRYSANTHEMUMS SPORTING.

There is a considerable amount of mystery attending the sporting of plants, and many theories have been advanced to account for sports or freaks in chrysanthemums. Some curious facts are to be noticed in this connection. For instance, a variety may sport the first year as a seedling, especially white and yellow on the same plant, or the variety keeps true for several years, and then sport in several parts of the country simultaneously. Again, these sports may produce other sports, as seen in the case of Madame Marie Masse, from which there have been at least ten distinct sports, without counting striped and intermediate shades. Then there is Caprice du Printemps, with almost as many eccentricities to its credit, although it kept true for several years before it produced the crimson sport, Kathleen Thompson. A few years afterwards there were sports and cross-sports—viz., "reverts," in ten or more different colours—but mostly inferior to the parent, being either bad doers or possessing dull colours, which should not be put into commerce. There are also the sports of V. Morel (including the green Ethel Amsden), Australie, Mdm. Carnot, and many others. Tuxedo was several years before it gave a sport, when it gave a fimbriated one called May McBean, and also a yellow sport. Niveus gave a fluffy petalled sport, and Polly may often be seen with greenish deformed flowers, so that although many plants sport, they are not always improvements on the original. The whites generally sport yellow, yellows bronze; pinks sport white or bronze, or with yellow shades; while white with pink shadings sport yellow with rosy bronze shadings.

CHAPTER XVII.

DRESSING BLOOMS FOR SHOW.

Incurveds want a great deal more dressing (or arranging) the florets than Japs. A great deal can be done while they are on the plants by pulling out any deformed florets or bad centres; but this must be performed very carefully, or the tweezers will bruise the good florets, and they will show it in a day or two. This will do more harm than good. It is better not to attempt to dress the blooms until as near to the time of the show as possible, in case the marks of the tweezers should show. The stiff-petalled sorts should be left until the last. Many of the largest and best flowers will perhaps take an hour or more to dress to make them perfect, as there are so many florets which get one into the other. These should all be parted, for that makes the flower so much larger. If there are any short petals in the centre, pull them out, so as to get some of the longest and best to form a good high centre, and build the others up regularly round them, until the flowers are finished. Do not cup your flowers too tightly, or the depth of them will be lessened thereby. A good incurved should be perfectly round and even when finished, with every petal showing itself distinctly.

I have known caterpillars to eat holes in incurveds sufficiently large to insert a nut. If these short stumps are pulled out the florets can easily be made to cover the hole so that no one can detect it; but, of course, every petal must be moved, and this reduces the size of the flower somewhat. In dressing blooms nothing must be added, not even a drop of gum, or it will disqualify the whole stand.

In arranging the blooms on the board the largest are generally put in the back row, then the next largest in the middle row, and the smallest, which are generally the neatest, in the front row. Incurveds must not be shaken

Clara Wells (Incurved).

about much in going to the show, or there will be a good deal to do to them to put them right again.

Japanese for Show.

Japanese blooms want but little dressing for show. Any crippled florets should be pulled out. Some of the straight-petalled varieties may have some short petals in the centre. These should all be pulled clean out. Then hold the flower the wrong way upwards, and give it a smart shake. The longer petals will be found to fill up the place of the shorter ones, and thus give the flower a deeper and more graceful appearance. Remember, at the same time, one may pull as much as one likes out of a flower, but nothing must be added. Of course, there are a good many opinions as to the propriety of dressing Japanese chrysanthemums, but, for my part, I am unable to see why it should be permissible to dress incurveds and that the line should be drawn at Japs. I have known judges to disqualify exhibitors for dressing Japanese incurveds, such as Mrs. Barkley, W. R. Church, and others, because the florets had been reflexed. The question ought to be decided by every Society, a rule being inserted in the schedule plainly stating whether reflexing was allowable or not. At Edinburgh the magnificent specimens are usually shown with long, beautiful florets reflexing naturally, while in the South of England equally magnificent specimens may be noticed with the florets artificially reflexed. In both cases the effect is the same—lovely. But, as I have said, some judges would disqualify in the latter instance, forgetting apparently that climatic variations make reflexing necessary. On a bright, sunny day all Japanese chrysanthemums reflex more or less; and surely the grower who strives after perfection of form, remembering that "a thing of beauty is a joy for ever," should be allowed to assist Dame Nature a little in this respect.

Other Varieties.

Anemones want but very little dressing; merely pull any loose or straggling florets out, arrange the guard florets

regularly all round, and remove any deformities from the cushion, to make it even all over.

Pompoms are generally shown on stems, and three blooms of a sort. They require but little dressing; still, they can sometimes be improved by a little arranging of florets, especially the anemone "poms." When arranging them on the board it is better to place them in tubes and plug them with moss than to tie them in bunches. They should be fixed so that each and every flower can be seen to the best advantage, and as evenly as possible all over the board, with the colours arranged so that each set harmonises with its neighbour.

Singles are either shown in threes or in sprays of two or three of each sort; and when they are nicely set up and arranged there is nothing in the whole show which attracts more attention. They should be staged in a similar way to pompoms (*see* above). The only dressing these require is the pulling out of any short or irregular florets, so that the flower appears as round and even as possible. Singles, for exhibition, should not have more than two rows of florets. I prefer to see singles and pompoms exhibited in sprays.

CHAPTER XVIII

JUDGING CUT BLOOMS.

The man who undertakes to discharge the duties of a judge at any flower show must be a man of knowledge, experience, and good judgment. He must have taste; he must be level-headed; he must have the critical faculty developed; and he must be blessed with that by no means common gift—namely, common-sense. All these qualities, and others which I need not stop to enumerate, are required of the judge at a chrysanthemum exhibition, and more especially in respect of the cut blooms section. In this department competition is usually very keen indeed, and a long and varied experience has taught me that in the vast majority of cases, where the level of excellence is high, unless the "point" system is adopted it is impossible for a judge to come to a fair decision. Where two or more judges are working together, any strong personal predilections are repressed; for it is hardly possible that two or three men will hold precisely the same opinion as to what constitutes a perfect bloom. The chief advantage of the point system of judging is that it enables an exhibitor to see which of his blooms (if any) were considered perfect, or which failed to come up to the standard, and by how much they fell short of it.

And here let me enter a protest against the present tendency of judges to lean strongly in favour of mere size. Some chrysanthemum judges seem to regard the rule measure as the supreme test, and give perfection of form and beauty of colour a secondary place. For my part, I venture to think this is a serious mistake. Mere bulk should not outweigh other considerations, and, personally, I should place colouring and symmetry before size. It is, to my mind, always a pity when a beautiful flower, perfect in colour and shape, and measuring, say, six and a half inches across, is passed over and the award given to another flower measuring nine inches across but inferior in other essentials.

The Point System.

With regard to the point system of judging, I believe much feeling would be avoided at chrysanthemum exhibitions if competitors were informed upon what grounds the awards had been made. This could easily be effected by means of Point Cards, which, filled in by the judges and signed, could be placed over the exhibits. I suggest something like the diagram on this page, taking five as the highest standard of excellence :—

JUDGES' CARD,

For Twelve Chrysanthemum Blooms.

Nov.... ..

Class.....Entry.....of the.....Chrysanthemum Society.

5	...	5	...	4	...	5	
5	...	4	...	3	...	4	
4	...	4	...	4	...	3½	
14		13		11		12½	Total 50½

1st Prize awarded to..... .....

Signed } *Judges.*

} *Secretary.*

Such a card need only be used when the competition is very close. Whenever used it would furnish a kind of standard up to which exhibitors could subsequently work, as they would see at exactly what value the judges had appraised each bloom. The winner's name could be filled in after the judges had signed the card.

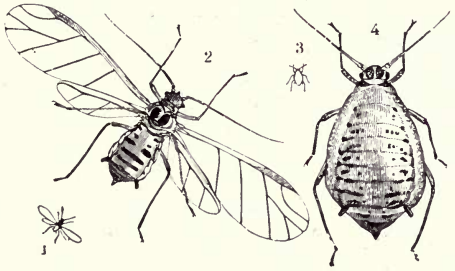
CHAPTER XIX.

INSECT PESTS AND DISEASES.

The difficulties of raising perfect chrysanthemums would be considerably reduced if it were not for the ravages of insect pests and the damage which is caused by disease. In this chapter, therefore, I propose to deal with some of the trials the grower has to face from these two causes. And first as to aphides.

Aphides.

If you succeed in clearing aphides from the top of a plant, they are almost sure to start new colonies under the



Aphides.

1 and 2. Male natural size and magnified.
3 and 4. Female natural size and magnified.

leaves, or all up the stems; or, if you clear them from there, and they drop to the ground, ants will take them into their holes and cherish them, until they can find them fresh leaves upon which to feed. And, of course, this is only natural, for the aphides are the cows, as it were, of the ants. The exudation from the aphide (honeydew) is sweet,

and is a substance on which the ant feeds. Have you ever seen an ant trying to get an aphide from the jaws of a lady-bird? It is very amusing to watch it; but Mrs. Lady-bird is always the conqueror, although Mr. Ant uses every artifice to try to induce her to drop her prey. To kill aphides nothing is better than perseverance with tobacco-powder and puff while the plants are outdoors, or fumigating while they are indoors.

Thrips.

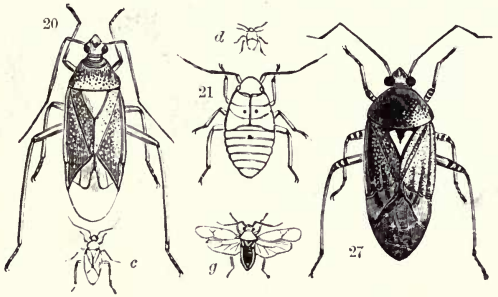
Thrips are sometimes troublesome to the young growths in dry seasons, but soot-water syringed or sprinkled over the plants will check them. This and an occasional dusting with tobacco-powder, or a good fumigating if the plants are indoors will effectually destroy the tiresome insects.

The Earwig.

One of the insects with which everybody is familiar is the earwig (*Forficula auricularia*), for there are few years in which they do not abound. They are a source of great trouble and loss to gardeners by feeding on the flowers and young shoots of many plants, their favourites being chrysanthemums and carnations. They are very voracious, but feed only at night, creeping into some sheltered place during the day. The best way to destroy them is to trap them by placing in their haunts something into which they can creep and hide. Small garden pots, half-filled with dry moss or crumpled paper; and short lengths of rods or reeds make useful traps. The stem of sunflowers and beans cut into lengths of 9 in. or 1 ft., are admirably suited for this purpose, particularly those of the former, as the pithy lining is somewhat sweet. The traps placed among the shoots of the plants which are attacked should be examined every morning, and the insects shaken or blown into a vessel of water with enough paraffin-oil floating on the top to completely cover the surface with a good film. This will effectually destroy them.

Bugs.

Another mischievous insect a chrysanthemum grower has to cope with is the small greenish bug, or fly (*Calocoris chenopodii*), nearly as large as a lady-bird. If one or more of the leading points of a plant are seen to be drooping while the others are fresh and green, depend upon it one of these tiresome insects is the cause of the mischief; and if you pass your hands gently up the stem they will run to the top or behind a leaf where they may be caught. They have very sharp piercers, with which they penetrate the soft stem to the centre and the shoot



The Green Bug.

20. magnified; *c* natural size.
21. pupa; *d* natural size.
27. another species (pale green); *g* natural size.

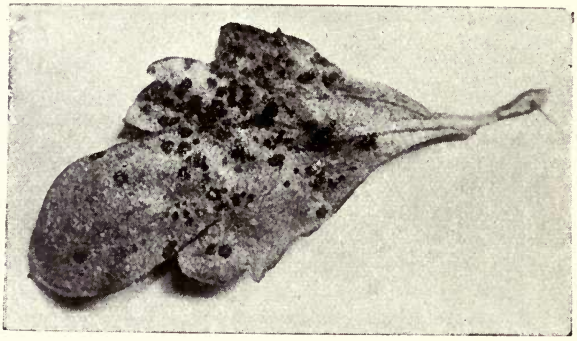
often goes blind, or becomes crippled. As soon as these insects leave the egg they can run about, being furnished with legs, horns, etc., like their parents, but their wings at this stage are not developed. In every stage of their existence they feed in the same manner, but the perfect insects are exceedingly active and can fly well.

A brownish-black bug which rejoices in the name of *Aphrophora alni* also gives a great deal of trouble. Sometimes it changes its coat, and for a day or two is of a red colour. These bugs act in a similar manner to the greenish ones mentioned in the preceding para-

graph, except that, when hunted, instead of flying away they drop as if dead. They are responsible for the black spots one sees on the lovely white flowers early in the season; and they are extremely difficult to catch amongst the florets.

Fungus.

This is a disease which first appeared all over Europe about the month of August, 1897. There seem to be two



Leaf Containing Fungus.

The above illustration shows a small leaf taken from an out-of-door plant which developed fungus, although it had never been fed or treated in any way, and certainly had not been crowded.

distinct stages (or crops) of spores. One stage makes its appearance about August, after a sudden change in the temperature. The disease, if not checked, makes rapid progress, for one plant with a few spots will soon distribute millions of spores, and in a few days or weeks spots will be seen in all directions. The fungus spreads very quickly after the plants are housed, if precautions are not taken to check it. The other stage appears just when the cuttings are rooting, or have just rooted. This is no doubt due to the spores which have fallen from the old leaves on to the cuttings below, and lie dormant until the cuttings

begin to show life after rooting. Generally it is said that over-feeding is the cause of the fungus, but this is entirely erroneous, because I have seen the worst cases of any many miles apart, and where they have been growing out of doors undivided for years, and no "fed" plants near them.

Another and more feasible explanation as to the origin of fungus is that it is communicated by air-borne spores which germinate on the leaf in an analogous manner to a seed growing in the soil. It is therefore necessary to apply preventive measures in the earliest stages, before visible signs of disease appear, by spraying with some solution which will destroy these spores. When spraying see that all parts, especially the under surface of the leaves, are well wetted; a spray which stands in globules on the leaves and will not spread is of little use. Remember that thousands of spores, etc., may adhere to adjacent woodwork, and this may with advantage be sprayed with stronger solutions.

Remedy for Fungus.

The fungus is a disease against which chrysanthemum growers have to battle, and as I have had to fight—and have vanquished—the enemy I recommend with considerable confidence the following methods of dealing with it :—

Spray every cutting or plant once a fortnight—from the day the cuttings are inserted or the old plants cut down—with about a wineglassful of paraffin mixed with one gallon of water, using an Abol syringe with a spray nozzle. If the solution can be kept thoroughly mixed double the strength may be employed. Then from July 1st spray the under part of the foliage with a dressing composed of the following ingredients: Half-pound each of sulphur, soft soap, soot, and lime. The lot should be boiled for half-an-hour in one gallon of water; a half-pint of paraffin should then be added, and the mixture allowed to simmer for a minute or so, care being taken to prevent it from boiling over. The dressing should be allowed to stand till it gets clear, and may be kept in bottles. A quarter of a

pint of the dressing may be used to a gallon of water. If, however, the fungus is very bad, and has obtained a hold of the plant, double the strength can be used without injuring the chrysanthemums.

Mildew.

This may be completely cured by syringing the under side of the leaves with "Abol" ("White's superior insecticide"), or the mixture that I recommend for fungus. In fact, if used as a preventive for fungus, mildew will not make its appearance at all.

Rust or Mould.

This is a kind of fungus known mostly among market growers, and is generally seen in plants which are crowded together in beds, sufficient air space not being allowed between them. It attacks some varieties worse than others, and in wet seasons more than in dry ones. The varieties which suffer most are:—W. H. Lincoln, Lady Fitzwigram, Mdm. Casimir Perrier, etc. I have seen plants perfectly healthy and green on Monday, with a few black spots on Tuesday, nearly every leaf black by Saturday, and by the Monday again—just a week from the attack—not a green leaf left—nothing but the stems and buds, the latter failing to swell afterwards. I do not know any cure for this disease except it be the observance of the precept, "Don't overcrowd."

The Leaf Mining Maggot.

There are a large number of leaf mining pests, but I am of opinion that the maggot which attacks chrysanthemums is the most troublesome of any. Its life history is exceedingly simple. The eggs are deposited in the leaves of plants by the full grown fly. These eggs speedily turn to tiny grubs, which burrow in the tissues of the leaf, beginning in fine thread-like lines, and gradually growing in size—like a river starting in a tiny stream from its source and increasing in size as it flows onwards. Sometimes the grub works towards the mid-rib of the leaf, and sometimes towards the edge. At the end of a few weeks

the grub turns to a chrysalis, and in a very short time emerges as a perfectly developed fly. The grubs of the leaf, moreover, are to be found on the plants in the autumn when the latter are housed. A cool temperature retards

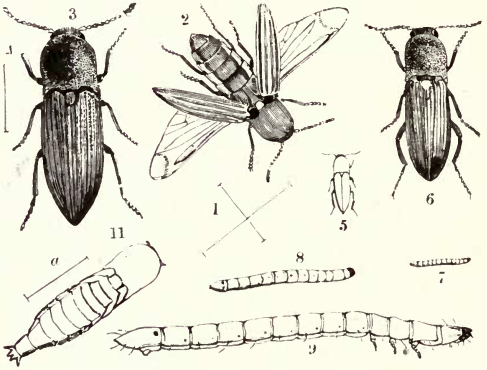
Leaf Mining Maggot.

their development, but in a warm atmosphere they increase and multiply at an amazing rate. Unless prompt measures are taken to destroy the flies, and so prevent them laying their eggs, an incalculable amount of harm will result. The best remedy is to smoke the plants and houses with "Auto-shreds." My plan is to carry out the

smoking operation on, say, a Saturday, and repeat it on the following Saturday, taking care to do the work very thoroughly. When the plants are in the open the best thing is to spray them once a week with a little paraffin solution (" Homco "). The fly will not settle on any leaves which smell of paraffin.

Wireworms.

Among the most deadly enemies of the chrysanthemum is the wireworm, belonging to an order of beetles form-

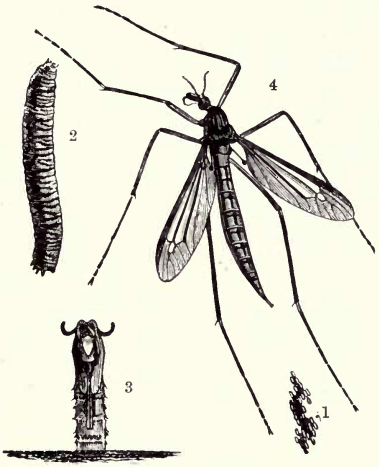


Wireworms.

2 lineatus magnified ; 3 obscurus ; 4 natural length ; 5 sputator ; 6 magnified ; 7 and 8 larva natural size ; 9 magnified ; 11 chrysalis ; a natural length.

ing the family *Elateridæ*, and commonly called " skip jacks " or " click beetles." They are most destructive when in the larva state, in which condition they remain four or five years. It is only by constantly working the soil and keeping it free from weeds or plants of every kind that wireworms can be starved out. They abound in old pastures where there is plenty of food to sustain them. In attacking a chrysanthemum a wireworm will begin by eating into the middle of the plant and then it will eat its way up through the stem to the top. Sometimes it eats a passage out, but it often descends by the way it worked

up the interior of the stem. Following this method one wireworm will destroy a number of plants. Birds devour a good many wireworms, but where they are very numerous the best plan is to trap them by placing carrots or pieces of cabbage or broccoli stumps beneath the surface of the ground and examining the "traps" daily, or they may be cleared out by digging vaporite into the ground.



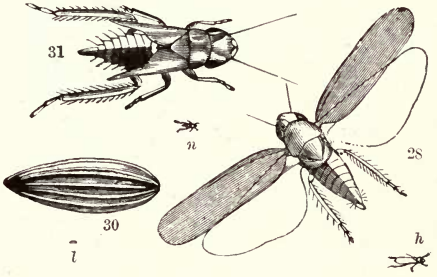
Daddy Long-Legs or Crane Fly.

1 eggs; 2 the maggot stage; 3 pupa; 4 female fully grown.

Daddy Long-legs.

This is a most troublesome pest, and while classified under the name of *Tipula Oleracea* is usually called the "Leather-Jacket Grub," "Crane Fly," or "Daddy Long-legs." The insect is very destructive among the cabbage tribe. It is not so injurious to plants in pots, as the soil is generally too hard for it to burrow in, nor in land which is constantly dug and weeded; but in land which has borne a good crop of weeds, or in an old pasture it will clear off chrysanthemums as fast as they are planted. I

have had to replant 10,000 'mums upon one acre of such land. Starlings catch thousands of "Leather Jackets" if the insects venture near the surface, but when the latter attack newly set plants, there seems but one way to deal with them—viz., to search round the plant and, having found them, kill them. I have seen sufficient to fill half a gallon caught day after day. Vaporite can be put into the ground to destroy them without killing the plant, or syringing with the smallest possible quantity of paraffin in the water is a good method to keep them at bay. It is only while in the grub state that they are so destructive; they bite small plants in two, and eat the rind off harder plants.



Frog Fly.

30 egg magnified ; *l* natural size.
28 flying ; *h* natural dimensions.
31 pupa ; *n* natural size.

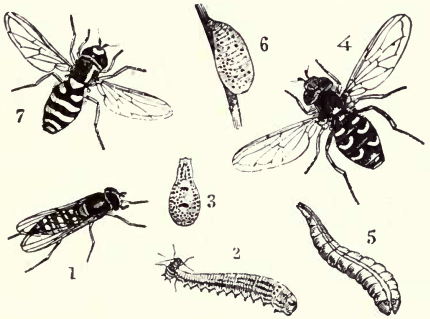
The Frog Fly.

Everyone has noticed upon various flowers little patches of frothy matter called "cuckoo spittle." This is caused by a tender little insect which by sucking the plant buries itself in this froth, which protects it from heat and other inimical effects until it is fully grown, when it changes to a pupa and finally to a fly—the "frog fly" or "jumper." These flies are sometimes credited with causing the mischief which is done by the green bug, but after they have left the frothy substance they do not pierce the plant. At the same time, it is well to destroy all that can be caught.

CHAPTER XX.

INSECT FRIENDS.

Having dealt in the preceding chapter with some of the principal insect pests with which chrysanthemum growers have to contend, I shall now allude to some of their insect friends. I need hardly say that there are insects which perform services of the greatest value to gardeners; indeed,



Hoverer Flies.

1 *Scæva balteata*; 4 *Scæva pyrastri*; 7 *Scæva ribesii*; 2 and 5 grub; 3 and 6 chrysalides.

without their assistance it would be well-nigh impossible to cultivate plants at all.

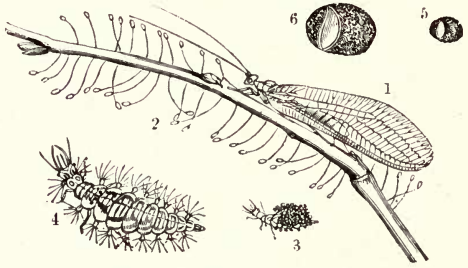
The Hoverer or Hawk Fly.

The Hoverer flies may often be seen hovering apparently motionless in the sunshine near trees or basking on leaves with their wings outspread. Their grubs are most voracious and feed entirely on aphides. They are quite blind, and although having neither eyes nor legs, they manage to kill an enormous number of aphides. The flies are of many

shapes and sizes, some being long and narrow, some short and thick. They fly very lightly to a shoot infested with aphides, lay an egg in their midst, and hover away to another shoot, and so on. These eggs soon come to life and begin feeding on the aphides. The grubs cling to the leaf or stem and feel about with their heads till they catch an aphis when they suck it dry, cast away the skin, and go "fishing" again. Thousands of these have been killed for caterpillars in ignorance, for they generally lie close to the stem, or on a leaf, as a caterpillar would.

The Golden Eye.

The eggs of this pretty insect, called also the "Lice-lion," are generally deposited amongst aphides, and attached to the ends of slender threads of a gummy substance (Fig. 2). When they are hatched they begin to feed voraciously upon aphides, and in the younger state they



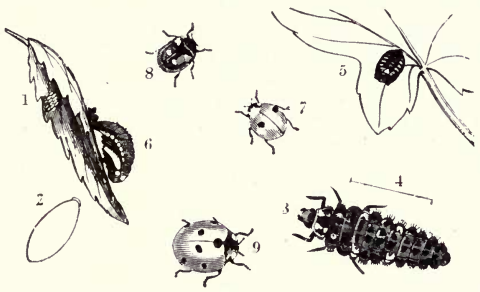
The Golden Eye.

5 and 6 cocoon magnified; 1 female; 2 eggs; 4 larva magnified; 3 larva covered with the skins of their victims.

cover themselves with the skins of their victims. In this way it is difficult to detect them, and they lie concealed from small birds and other enemies; but when they are grown somewhat they are more greedy than the larva of the lady-bird—hence their name, "Lice-lion."

The Lady-bird.

The lady-birds (*Coccinella septempunctata* and *C. bi-punctata*) produce grubs which are most useful in destroying aphides. The grubs are flattish, of a dark or leaden grey colour, and ornamented with black and yellow spots; the grubs of both species (seven- and two-spotted lady-birds) are very much alike, but those of the two-spotted



Lady-Birds.

1 and 2 eggs (natural size and magnified): 3 and 4 grub; 7, 8 and 5 two-spotted lady-bird and chrysalis; 9 and 6 seven-spotted lady-bird and chrysalis.

species are considerably smaller than those of the other, being not more than a quarter of an inch in length. They change their coat several times during growth, and are continually searching for, and feeding on, aphides. When fully grown they turn to a chrysalis, and remain gummed to a leaf until they reach the mature state of a lady-bird.

Air Bees or Wasp Flies.

These are of different shapes and colours; some are dark and similar to a large ant, others long and narrow, not unlike a small wasp. These insects make their nests in

rotten wood, or in bamboo canes, building their doorways with clay. They catch small caterpillars, aphides, and

One of the Wasp Flies.

other destructive insects, and are very useful amongst chrysanthemums.

Birds.

The little Jenny Wren and Golden-Crested Wren are great friends to gardeners, for they catch multitudes of aphides and small bugs and caterpillars. Even after the plants are housed they will almost live amongst the plants if they are not frightened away. House martins and swallows are, of course, also useful. In conclusion, I may say that I am indebted to the pages of "Farm Insects," by John Curtis, for some of the facts set forth in these two chapters on insect pests and insect friends.

CHAPTER XXI.

HINTS ON WHAT NOT TO DO.

Not many people care to expose their failures, although there are very few indeed who do not meet with them. If they do not they are lucky. A gardener who never experiments at all is not much good to the gardening world. Then why should not one make known one's failings to warn others? One need not be ashamed of them. So here let me express a few cautions.

Don't trust others to do what you can do yourself, unless you have proved them trustworthy. I do not mean that there are no trustworthy young men, for there are men as good now as ever there were; only I sometimes wish there were more of them.

Don't propagate too early, unless you are thoroughly experienced, or your plants will become drawn and weakly.

Don't syringe or water any plants after 3 p.m. in the spring months, or when there is any danger of frost. It is better to let them flag a little than do this.

Don't water a plant in any stage until it is sufficiently dry. The pot will ring or sound hollow when tapped with the knuckles if it be dry. You might be deceived by the tops lopping a bit when the sun and wind are on them after a spell of dull, damp weather.

Don't kill any hoverer flies, lacewings, or any lady-birds (or their larvæ, which, of course, turn to lady-birds), for they live entirely upon aphides. The larva is a small lizard-like insect (*see* "Insect Friends").

Don't water any plants or slop any water about the houses after midday when the plants are in bloom if you can possibly avoid it, for the large flowers damp off so easily, especially the dark varieties.

Don't say you cannot grow chrysanthemums, because, personally, I do not believe that little word "cannot" was invented for gardeners. Say I will grow them, and stick

to it until you have done it satisfactorily. You will then not be likely to leave it.

Don't enter in larger classes, when exhibiting, than you can manage properly. It is better to show twelve good blooms than twenty-four with four or five, or even one weak bloom.

Don't get down-hearted if you do not gain all first prizes at your first attempt at exhibiting. There are many old exhibitors who are very glad to stand in the prize list at all.

Don't use bones for drainage to pots. You may be successful for a year or two, but at some time or other you will regret it.

Don't use stimulants of any kind too strong, but weak and often, and on no account before the pots are full of roots. Be very careful with chemicals. I have known the fumes which arose from nitrate of soda and sulphate of ammonia destroy the leaves two feet up the stems. This is often the cause of naked stems.

Don't take out the break shoots too close to the bud when securing the latter, but leave one just below it, and another six inches or so below that, until the bud gets started. These growths will do no harm for a few days, but, of course, must then be removed, or the bud will most surely suffer.

Don't allow any plants to be blown about unsecured by a stake at any time, for the month of September very rarely passes without a rough wind.

Don't leave any plants out unprotected after the end of September, for a sharp frost may occur any night.

Don't pot a plant at any time if it is very dry, or use a dirty pot, otherwise when you come to re-pot you may find the tender roots sadly torn and sticking to the old pot.

Don't water a plant when it is already wet enough at the roots, as this will cause sappy growth and sour the soil.

Don't water a plant for a few days after it has been potted, but sprinkle it overhead two or three times a day in hot weather to keep it from flagging.

Don't ram the soil too firmly in the pots, but so that the water may pass freely through them.

Don't put away a tool of any description until it is clean and ready to use another day.

Don't lend a good tool to anyone.

Don't fail to read the rules of any society's schedule where you intend to exhibit, for non-compliance with the rules may disqualify you.

Don't forget to see that your greenhouse is drip proof, or you will rue the havoc rain-drops will make with the flowers.

Don't forget to recommend this book to all your friends if you are pleased with it yourself.

TESTIMONIAL.

ST. OSWALD'S NURSERY,
SOUTHEND-ON-SEA.

W. WELLS & Co.

DEAR SIRS,

Thinking you would be interested to hear how I succeeded with the packet of Single 'Mum Seed I had from you, I enclose photo of one of the plants. I have had some very fine flowers. I enclose two of the varieties, one the same as in photo and a yellow one, which I think is very good. From the photo you will have some idea of the size of the plant. I put the one in photo up for exhibition at our 'Mum Show, and nothing was ever seen like it here. The seed was sown on February 9th, 1909; have been cutting regularly since the last week in August. Height of plant, 47 inches, and 40 inches through.

Yours truly,
JAS. ANDERSON.

See Plate, page 45 of this Book.

CHAPTER XXII.

HINTS ON WHAT TO DO.

I have given advice on what to avoid, and it may be appropriate to emphasise several things it is essential to remember. Therefore I have jotted down the following hints :—

Take your cuttings from healthy, unforced plants.

See that your pots, if new, are soaked well in water before you pot; if old, that they are well washed and dry before you begin, or you will lose a mass of fibry roots, when the plants come to be turned out of these pots, from the small roots sticking to the sides.

Remember that the more roots you have to your plant the better it will be. To secure abundance of roots pot up gradually from *small* to full-sized pots, by various sizes. Every time the root reaches the side of the pot it branches and runs round. When this is effected it is time for a further shift.

Keep cuttings close, either covered with a glass or shut up in a case. This maintains the moisture all round the cutting and prevents evaporation of the juices of the cutting, which would otherwise wither and die.

Use long clean labels, upon which place name, date, number, etc., leaving room for further remarks during the summer.

Keep all your dates for future guidance.

Use preventives against disease at intervals rather than delay till appearance of malady.

There is a place for everything, and everything should be in its place.

When receiving new plants from the nurserymen it is best to keep them close for two or three days, in case they have been taken from a warm house.

Always be punctual as regards the time announced for the completion of the staging of your flowers at shows

ready for the judges. A rule in vogue is to ring a bell 15 minutes before the judging, and an announcement is made that only a quarter of an hour will be allowed. At

Miss Alice Finch.

the stroke of the clock the sweepers commence at one end and everyone is cleared out.

No weeds grow where no weeds are allowed to seed.

A garden which is always clean never looks untidy.

A clean workman never allows dirt to accumulate.

CHAPTER XXIII.

THE STERILISATION OF SOIL.

I find that comparatively few gardeners are acquainted with the good results of steaming soil in order to kill the seeds of weeds, as well as to destroy spores and the larvæ of insects. But the steaming process is a very valuable way of enriching mould intended for growing cuttings and plants in pots and boxes.

When every yard of loam has to be carted five or six miles it becomes an expensive business, and when it is first used for large plants, then, perhaps, for cucumbers or tomatoes, and afterwards for propagating, the soil loses some of the properties which a chrysanthemum requires. At the same time it has probably become full of weed seed, or spores, or other soil pests. This being the case I determined to try sterilising a heap of about 90 yards at the Merstham nurseries, the object being principally to get rid of chickweed seed.

I believe that the plan of steaming soil could be very advantageously followed in large nurseries and gardens where great quantities of plants are raised in boxes and pots. In hothouses weeds grow riotously in the humid atmosphere, so that by hand-labour it is next to impossible to keep them down. The mould for potting cuttings, being used again and again year after year, in time becomes full of seeds. Apart from the labour necessary for ceaseless cleaning, the weeds, growing with almost tropical rapidity, take away the food constituents of the soil from the plants which the gardener is devoting all his skill and time to raise.

As regards gardens of moderate size, small quantities of soil may be steamed by putting the mould in a pail and standing the latter in a copper with water which reaches half way up the pail. As the water boils the soil will be steamed through. The lid should be kept on the copper to prevent the steam from escaping.

CHAPTER XXIV.

THE BEST BLOOMS FOR EXHIBITION.

In the lists which are printed below will be found the names of the best Japanese, incurveds, early flowering doubles, and single chrysanthemums.

As regards the incurveds, I am indebted to Mr. W. Higgs, of Leatherhead, for compiling the list, and as he is the champion incurved grower his selections will be accepted without question.

With respect to the Japs a few remarks seem desirable. The table is arranged alphabetically. I am well aware that any man who compiles a list of the best chrysanthemums challenges criticism, and perhaps it may disarm criticism so far as this list of Japs is concerned if I admit that there are some varieties not included which, in the hands of certain growers, might do as well as some varieties which are included. It would be absurd for any man to say: "Here is a list of the best Japs, and a broad line of demarcation separates any variety on my list from the best variety that can be mentioned which is not on my list." But the 60 'mums enumerated below are in my judgment the best in Great Britain at the present time for all-round cultivation and exhibition.

Best Sixty Japs for Exhibition.

I have not attempted to submit 12 or 24 varieties as the best out of the 60 I have named, because there are many varieties which do better in the north than in the south, and *vice versâ*.

Many varieties which I advise to be stopped for second crown may be grown on the first crown in the north, and in the south also if the cuttings are inserted at the end of January or the beginning of February, but this necessitates a knowledge of the varieties, or, in other words, a year's trial.

The best time to secure first crown buds is from August 10th to 15th, and second crown buds from

August 15th to 20th. In the list given below the following should be noted :—

A means insert cuttings as early as possible in December. Do not stop at all, but secure second crown buds.

B means insert cuttings in December, or early in January. Nip out the point of the plant early in April, and secure second crown.

C means insert cuttings during December, and secure first crown.

D means that these varieties may be stopped early in April, and again at the end of May.

Algernon Davis	... ...	B	
Beatrice May	... ...	B	
Beecham Keeling	... ...	C	
Bessie Godfrey	... ...	C	
C. H. Totty	... ...	B	
Edith Jamison	... ...	B	
Edith Smith...	... ...	B	
Frank Payne	... ...	C	
F. S. Vallis ...	... ...	C	
Gladys Blackburn	... ...	A	
Geo. Mileham ('08)	...	A	
J. Lock ...	... ...	B	
J. H. Silsbury	... ...	A	
John Peed ...	... ...	C	
Lady Crisp ...	... ...	C	
Lady E. Letchworth	...	C	
Lady M. Conyers	... ...	C	
Lady Hopetoun	... ...	B	
Lady Talbot	... ...	A	
Leigh Park Wonder	...	B	
Leslie Morrison	... ...	B	
Madam G. Rivol	... ...	C	
„ P. Radaelli	...	C	
„ R. Cadbury	...	C	
Magnificent...	... ...	A	
Marquis of Northampton	...	C	
Mary Inglis...	... ...	D	
Mary Mason	... ...	A	
Master James	... ...	A	
Maud Jefferies	... ...	A	
Melchet Beauty	... ...	A	
Miss Annie Nicoll ..	...	C	
„ Elsie Fulton ...	...	C	
„ Miriam Hankey	...	B	
Mrs. A. G. Pirie	... ...	C	
„ A. T. Miller	... ...	C	
„ C. H. Totty	... ...	A	
„ C. Penford	... ...	C	
„ G. F. Coster	... ...	A	
„ Geo. Mileham	...	C	
„ H. Stevens	... ...	B	
„ J. E. Dunne	... ...	A	
„ L. Thorn	... ...	A	
„ N. Davis	... ...	A	
„ W. Knox	... ...	A	
O. H. Broomhead	... ...	B	
Pockett's Crimson	... ...	C	
President Viger	... ...	B	
Purity ...	... ...	B	
Reginald Vallis	... ...	B	
Rose Pockett	... ...	A	
Splendour ...	... ...	A	
Superb ...	... ...	B	
The Hon. Mrs. Lopes	...	C	
Valerie Greenham	... ...	B	
W. A. Etherington...	...	C	
Walter Jinks	... ...	C	
W. Beadle ...	... ...	A	
Wm. Gee ...	...	B	
W. Mease ...	... ...	A	

BEST 36 INCURVEDS FOR EXHIBITION.

	Insert Cuttings.	Stop.	No. of Shoots to Second Break.	First or Second Crown.	Bud secured in August about.	Feed after buds taken.
Clara Wells	End Dec.	Natural	3	1st	Middle	freely
Buttercup	,, ,,	,,	3	,,	,,	,,
Lady Isabel	Early Dec.	End Mar.	1	2nd	End Aug.	,,
Mrs. G. Denyer ...	,, ,,	,, ,,	1	,,	,, ,,	,,
H. W. Thorp	,, ,,	,, ,,	3	,,	,, ,,	,,
Mrs. Barnard Hankey ...	,, ,,	,, ,,	1	,,	,, ,,	,,
Duchess of Fife ...	,, ,,	Natural	3	1st	Middle	,,
Embleme Poitevine ...	,, ,,	End Mar.	1	2nd	End Aug.	,,
Daisy Southam	,, ,,	Natural	3	1st	,, ,,	,,
Mrs. F. Judson... ...	,, ,,	,,	3	,,	Middle	sparingly
Topaze Orientale ...	End Dec.	End Mar.	1	2nd	,,	freely
Frank Hammond ...	Early Dec.	Natural	3	1st	,,	,,
Mrs. J. Hygate... ...	,, ,,	,,	3	,,	,,	,,
C. H. Curtis	,, ,,	,,	3	,,	,,	,,
Triomphe de Montbrun	,, ,,	End Mar.	1	2nd	,,	sparingly
May Phillips	,, ,,	,, ,,	1	,,	End Aug.	freely
Frank Triston	,, ,,	Natural	3	1st	,, ,,	,,
W. Pascoe	,, ,,	,,	3	,,	,, ,,	,,
Pantia Ralli	,, ,,	End Mar.	1	2nd	Middle	,,
Miss F. Ashworth ...	,, ,,	,,	1	,,	,,	sparingly
Miss Nellie Southam ...	,, ,,	Natural	3	1st	,,	freely
Ialene	,, ,,	End Mar.	1	2nd	,,	,,
W. J. Higgs	,, ,,	,, ,,	3	,,	,,	,,
G. F. Evans	,, ,,	,, ,,	1	,,	,,	,,
Boccace	,, ,,	,, ,,	1	,,	,,	,,
Mrs. J. Wynn	,, ,,	Natural	3	1st	,,	,,
Romance	,, ,,	End Apr.	3	2nd	,,	,,
Souv. de Wm. Clibran...	,, ,,	,, ,,	3	,,	,,	,,
W. Biddle	,, ,,	End Mar.	1	,,	,,	,,
Miss Cora Stoop ...	,, ,,	Natural	1	,,	,,	,,
Godfrey Eclipse... ...	,, ,,	End Apr.	3	1st	,,	sparingly
Le Peyrou	,, ,,	End Mar.	1	2nd	,,	freely
Calypso	,, ,,	,, ,,	1	,,	,,	,,
H. Hearn	,, ,,	Natural	3	1st	,,	,,
Amber Beauty	,, ,,	End Mar.	1	2nd	,,	,,
Hanwell Glory	,, ,,	,, ,,	1	,,	,,	,,

Thirty-Six Good Singles.

Altrincham Yellow, Albert Williams, Bronze Pagram, Beauty of Weybridge, Doreen, C. J. Ellis, Cannell's Crimson, Cloth of Gold, Edith Pagram, Earlswood Beauty, Felicity, Felix, Florrie Stevens, Gracie Trower, Kitty Bourne, Marguerite Pink, Mary Richardson, May Ellis, Mensa, Merstham Jewel, Merstham Tints, Merstham White, Miss Mary Anderson, Mrs. Hazlehurst, Mrs. E. Cannell, Nellie Riding, Pink Felicity, Peter Pan, Robert Thorp, Rose Pink, Roupel Beauty, Sylvia Slade, W. Buckingham, White Pagram, Winnie Wells, Winnie Sherring.

Good Singles for Pot Culture.

Albert Williams, Alice Crate, Altrincham Yellow, Cannell's Yellow, Charles Graves, Doreen, Emily Clibran, Felix, Florrie Stevens, Grace, Gratchen, Innovation, Kitty Bourne, Ladysmith, Mary Richardson, Merstham White, Miss Irene Cragg, Miss Mary Anderson, Mrs. E. Isaacs, Mrs. Sam. Nash, Nellie Riding, Robert Thorp, Rose Pink, Sylvia Slade.

Twelve Large Anemones.

Delaware, Descartes, Ernest Cooper, Gluck, Junon, Mrs. Caterer, John Bunyan, Mrs. H. Gardener, Mrs. H. Eland, Mrs. Shimmins, Sovr. de D. Souille, W. W. Astor.

Twelve Pompoms for Exhibition.

Aurora Borealis, Black Douglas, Elsie Walker, Lizzie Holmes, Maid of Kent, Miss Bateman, Nellie Rainford, President, Prince of Orange, W. Kenedy, Wm. Sabey, W. Westlake.

Twelve Anemone Pompoms for Exhibition.

Aglaia, Antonius, Astarte, Bessie Flight, Briolas, Calliope, Emily Rowbottom, Marguerite de Coi, Marie Stuart, Mdm. Sentir, Mr. Astie, Perle.

Twenty-four Early Double Varieties for Borders.

(Not to be disbudded).

Auguste, Border Beauty, Carmelite, Carrie, Champ d'Or, Connie, Crimson Diana, Diana, Ethel Blades, Francis, Harrie, Holmes White, J. J. Hart, Leslie, Lillie, Nina Blick, Provence, Perle Rose, Rosie, Savoie, Tapis de Neige, Tonkin, Tottie, Wells' Scarlet.

Twenty-four Early Double Varieties for Cutting.

(d for Disbudding, s for Sprays.)

Ethel Blades, s.; Fee Parisienne, d.; Goacher's Crimson, d.; Golden Glow, d.; Hector, d.; J. Bannister, d. or s.; Jimmie, d.; Le Cygne, d.; James Bateman, d. or s.; Leslie, d. or s.; Mrs. E. V. Freeman, d. or s.; Normandie, d. or s.; Nina Blick, d. or s.; Perle Chatillonaise, d. or s.; Perle Rose, d.; Polly, d. or s.; Primevere, d.; Roi des Blancs, d. or s.; Savoie, d. or s.; Tapis d'or, d.; Tonkin, d. or s.; Wells' Primrose, d.; White Quintus, s.

Twenty-four Early Flowering Singles for Borders.

Brazier's Beauty, Carrie Luxford, Dominion, Eric, Goldlace, Good Hope, Hilda's Favourite, Jessie Wallace, Kate Carter, Kate Westlake, Kitty Graham, Marie Corelli, Mary, Marion Bannister, Merstham Glory, Mrs. Earle, Nellie King, Nellie Riding, Snowstorm, Spitfire, Surrey, Walton Bradbury, Wells' Pride, White City.

Twenty-four October Double Varieties for Cutting.

Adonis, Caprice du Printemps, Diane, Ernest Daudet, Etoile Blanch, Flore, Kathleen Thompson, Le Cygne, Le Pactole, Lizzie Adcock, Mdlle. Melaine Fabre, Miss Doris Raeburn, Mons. W. Holmes, Mrs. E. V. Freeman, October Gold, Primevere, Source d'or, Soleil d'Octobre, Terracotta Soleil d'Octobre, White Caprice, White Countess, White Quintus, Crimson Precocite, Mdlle. Elise Dordan.

The foregoing varieties will generally flower out-of-doors except a frost of six or eight degrees occurs.

Twenty-four November Double Varieties for Cutting.

Clara Vurnum, Cannell's late Prolific, Felton's Favourite, Foxhunter, Freda Bedford, Hortus Tolosanus, Market Red, Mdlle. Marguerite Desjouis, Miss M. Godfrey, Money-maker, Mrs. A. Duncan, Nellie Pockett, Hetty Wells, Western King, Parson's White, Petite Renee, Phosphorescens, R. F. Felton, Embleme Poitivene, Mrs. Dixon, Mrs. George Rundell, William Biddle, Romance, Buttercup.

Thirty December and January Double Varieties for Cutting.

A. J. Balfour, Bronze Princess Victoria, Docteur Enguehard, Golden Thompson, Golden Princess Victoria, Heston White, Mdm. H. Douillet, Market Gold, Matthew Hodgson, Miss Clay Frick, Miss Miriam Hankey, Mrs. Joseph Thompson, Mrs. W. Elliott, Nagoya, Snowflake, Satin Rose, Tuxedo, Violet Lady Beaumont, W. Duckham, White Queen of the Exe, Winter Cheer, Wells' late Pink, Mrs. Filkins, Sam Caswell, Louisa Giles, Mrs. F. Judson, Miss Muriel Smith, Mrs. Barkley, Thorp's Christmas Rose, Major Bonnaffon.

Some of the Best Novelties in 1909.

Mrs. R. Luxford, Rose Ellis, Alice Lemon, Kara Dow, White Queen, Empress, Mary Farnsworth, Favourite, Leviathan, Laura Hill, Miss L. Hall, Mrs. R. H. B. Marsham, Mrs. Thornton, Mrs. W. Iggulden (yellow sport from Mdm. G. Rivol), Mary (yellow sport from Mrs. C. Beckett), Maggie Baillie, Francis Joliffe, J. Wynn, Fanny Lemon, Howard Gould (this variety was shown as Bessie G. Payne in England, in 1909, but it had previously been named Howard Gould by W. Wells while in America).

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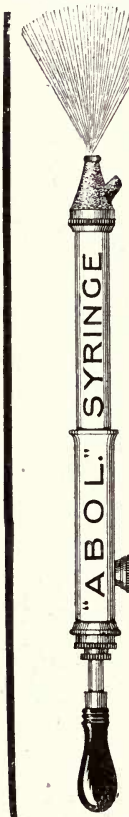

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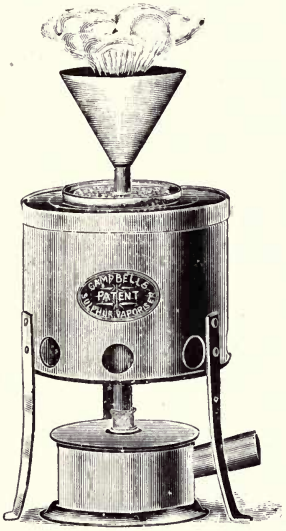

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